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THIS ISSUE PD REVIEWS:

- I.S.T.'s Formosa Fins
- Ultimate Dive Ind.'s Speargear

WRECK ALLEY
California's Big Boat Graveyard

SIX-PAK TO POINT SUR
A Fast Boat to the Outer Limits

STRAIT OF JUAN DE FUCA
Rugged Beauty, Awesome Diving

DIVING HAWAII'S KONA COAST:
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VOLUME III

NUMBER 1

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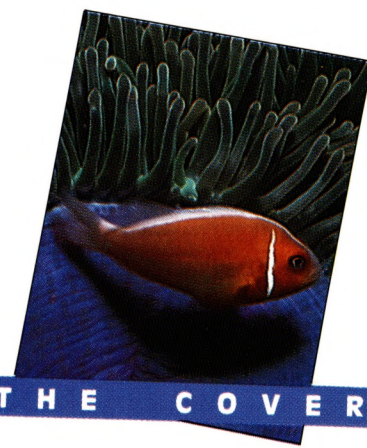
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Clownfish hovers over an anemone patch in the warm waters of Palau. Photo by Bruce Rasner of Irvine, California.

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EDITORIAL

The Day of the Dolphins

I like to call April 12, 1990, the Day of the Dolphins, because it was on that day that H.J. Heinz, parent company of StarKist Tuna, the largest tuna company in the world, announced that, effective immediately, it would stop buying, processing and selling tuna caught in purse seine nets in association with dolphins. H.J. Heinz also agreed to join with Earth Island Institute, the organization that had spearheaded the action for the protection of dolphins, in supporting the passage of federal labeling legislation, pledged to put "Dolphin-Safe" labels on all its tuna products within the next few months and agreed to support an all-out ban on the sale of "Dolphin-Unsafe" tuna in the United States.

The H.J. Heinz announcement set off reactions the world over. For example, the Thai and the French Canners Associations have since stated that they will no longer process dolphin-caught tuna, and the two largest tuna companies in Italy have claimed that from here on out they too will strive to be dolphin-safe. At the same time, pressure is building in Canada, England and the European Economic Community to prevent those countries from becoming a dumping ground for dolphin-caught tuna. Only Japan has stated that it intends to continue accepting drift net and dolphin-caught tuna without any reservations.

By complying with a number of stringent guidelines set forth by Earth Island, StarKist became the first tuna company in the world to be classified as "Dolphin-Safe." Since then, the only other tuna company to provide enough information and commitments to Earth Island to share the "Dolphin-Safe" classification is Chicken of the Sea.

For this reason Earth Island has announced that, effective immediately, the nationwide tuna boycott has been lifted from StarKist, and the boycott has been suspended from Chicken of the Sea.

The H.J. Heinz decision of April 12, which is considered the most important action taken for the protection of dolphins since the passage of the Marine Mammals Protection Act of 1972, is due in large part to the pressure exerted by millions of consumers like you and me who pressed for an end to the dolphin slaughter by boycotting canned tuna. Consequently, this is a great victory for those of us who believe in the power of individual action, because it has illustrated that we as individuals *can* make a difference.

Individuals like Riad Yakzan of Santa Monica who used to get thrown out of grocery stores for putting up signs protesting the killing of dolphins — Riad made a difference. And Stacy Bedwell of La Mirada who bought *Save*

the Dolphins tee-shirts to wear around her high school — Stacy made a difference too. As did all the restaurants that decided to stop serving tuna in spite of the loss in revenues, and the grammar school children who refused to eat tuna in their school cafeterias, and those commuters who put bumper stickers on their cars to give their freeway compatriots something to think about in rush hour traffic, and all the sport divers and other environmentally-conscious individuals who refrained from eating tuna sandwiches, all of us should feel pretty damn good right now, because our individual actions made a difference.

And to all the nay-sayers out there, those who poo-pooed the tuna boycott by saying that it wouldn't change anything — well, hopefully next time they will exert their own power as individuals so they can make a difference too.

That "next time" happens to be right now, because in spite of the admirable actions of "Dolphin-Safe" StarKist and Chicken of the Sea, other tuna companies like Bumblebee, Three Diamonds, Geisha, Carnation and "house" brand tuna companies, in spite of their supposed-enthusiasm for the H.J. Heinz decision while the television cameras were rolling, have apparently decided to continue buying tuna from dolphin-slaughtering boats in the hopes that nobody will notice.

Well, we've noticed.

StarKist and Chicken of the Sea are committed to taking specific, positive steps to protect our dolphins; other tuna companies are not. Therefore, we as individuals should make a distinction between the two camps. According to H.J. Heinz officials, because of the steps they have taken to become "Dolphin-Safe," StarKist tuna prices can be expected to rise from two cents to 10 cents a can. I say that paying an extra dime for a can of tuna from a "Dolphin-Safe" company is a price I will proudly pay to support a tuna company that is supporting our cause. As for the other tuna companies, I say to hell with them.

April 12 was a great day for dolphins, it was a great day for "Dolphin-Safe" StarKist and Chicken of the Sea, it was a great day for us all. And now I feel like celebrating. It's been over two years since I've enjoyed a tuna melt on sourdough, so I think I'll cruise on down to the local cafe, ask them who they buy their tuna from, and if it's StarKist or Chicken of the Sea, I'm going to partake in a victory feast. Of course, if it's not StarKist or Chicken of the Sea, I'm going to heft my individual power off that counter stool and take it somewhere else, because while the major battle has clearly been won, the war is not over yet.

John Brumm
Editor

Mares Introduces Vector I.

A vest with a new anatomical cut that's close fitting, yet has high buoyancy.

Comfortable, with an adjustable back pack to fit any diver perfectly. And a new stabilizing cummerbund that fits close whether the jacket is inflated or deflated.

It incorporates interchangeable pockets with reflective fluorescent bands to match other Mares gear.

Including a left-hand pocket with a mesh goody bag that expands to hold just about anything.



Efficient, with a new Rapid Exhaust valve that releases air with a gentle pull. Plus a new Multi-Air™ inflator system which comes with a second stage octopus as standard equipment on the Vector I.

And Vector II has many of the same features as Vector I, including the high tech Multi-Air™ inflator system and adjustable back pack.



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Deep respect for Vector I and II

It was black with an iridescent pink and lime green design across its chest, pulsating with an easy rhythm, moving with graceful ease through the watery depths. "A new form of marine life?" wondered an Angel Fish. Closer inspection revealed it was a diver wearing one of the new Vector BC vests from Mares.

The school gained a new appreciation for human intelligence.

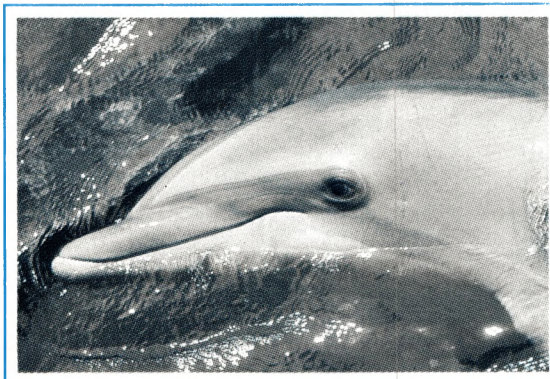
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PUBLISHER
ROBERT SCOTT TWILEGAR

EDITOR
JOHN BRUMM
ASSOCIATE EDITOR
MAUREEN GLICK
SCIENCE EDITOR
DR. TOM GARRISON

CONTRIBUTING EDITORS
RICK BAKER / THE PACIFIC
GILBERT CRUZ / NORTHERN CALIFORNIA
JOHN FRANCIS / BAJA CALIFORNIA
DR. TOM GARRISON / SEA LIFE
F. STUART WESTMORLAND / PACIFIC NORTHWEST

FEATURE EDITORS
DARREN & STACEY DOUGLASS

EDITOR-AT-LARGE
JONI DAHLSTROM

FIELD PHOTOGRAPHER
ADAM ZETTER

STAFF PHOTOGRAPHER
STEVE ESSIG

CONTRIBUTING WRITERS
RALPH BRYAN, LYND STRINGER, F. STUART
WESTMORLAND, DAVID WROBEL

CONTRIBUTING PHOTOGRAPHERS
RICK BAKER, STEPHEN BENAVIDES, JOHN
CHEVERTON, KENNETH CORBEN, CHRIS HUSS,
PRESTON KUNTZ, DIEGO LIRMAN, BOB LYNN,
RUFINO MONTALVAN JR., RON OWEN, BRUCE
RASNER, GREG VOLGER, ROB WILDER,
DAVID WROBEL

ART DIRECTOR
LUAN LAPERNA
PRODUCTION MANAGER
DAVE DALMAS
TYPOGRAPHERS
GEORGE PISANO
SALLY URENA

ADVERTISING DIRECTOR
TERRY McCORMICK
ADVERTISING COORDINATOR
RACHEL DALLAS-NOBLE
ADVERTISING SALES REPRESENTATIVES
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LETTERS

Editorial Hits Proverbial Nail on the Head

GGGaaawwddd DDDaaayyyuuu-mmm! That was one helluva editorial in the March/April 1990 issue of PACIFIC DIVER. You hit the proverbial nail right on the head from top to bottom and side to side. I've been trying to say what you said in my articles for years and only scratched the surface.

I too have heard Jean Michel Cousteau speak. And his father as well. All too often, we see only our own little corners of the world without focusing on the big picture. Jean Michel's illustration using the Berlin Wall was not only timely but brilliant. There's hope in all things, isn't there?

Your editorial hit home in so many ways. Keep up the good work. Go ahead, aim that missile. But don't fire. Buy that *Save Our Shores* tee-shirt and wear it proudly. You are doing something. You are making others aware through your editorials. Congratulations.

Dick Dresie
Kailua-Kona, HI

U.S. Divers Treats Customer Like a King

Recently I had something occur that all PACIFIC DIVER readers should be made aware of.

I have been diving for 21 years and have been using U.S. Divers equipment. I have had few problems with my gear and take incredibly good care of it. But on a trip to Santa Barbara Island I had a problem with my BC. So later that week I drove by the U.S.D. plant in Santa Ana to see if they could help me. I was greeted quite warmly by the lovely receptionist, and the customer service representative was also charming and helpful. As it turned out, I had arrived at lunch time, so I was asked to see the owner of a dive shop near the plant to have him evaluate the problem with my BC and then return if deemed necessary.

After looking at my BC the store owner thought the problem could be warrantied, so I went back to U.S.D. after lunch. I then met the plant technician, Harriet Campbell, who took the BC into the back room to examine it. She returned and replaced my BC right there on the spot!

I firmly believe that this kind of personal service is the heart of the reason why U.S. Divers is the "Cutting Edge" of undersea technology. They treat their customers better after the sale than any company I've ever done business with.

My special thanks to Harriet, Lisa and Shar who treated me like a king! And to

all those at U.S. Divers who through the years have supported me without my even knowing it!

William P. Rhinehart
Riverside, CA

Macho Means Reckless, and Reckless is Stupid!

After reading Mr. Mike Dewing's letter in the May/June 1990 issue of PACIFIC DIVER, I felt it merited a response.

I too, like Mr. Dewing, have been diving for some time (since 1958) and have logged nearly 500 dives — some commercial. However, I do not join in his quest for articles written ONLY for "real" or "experienced" divers.

In early 1965, I spent nearly three weeks planning a dive trip to Australia with an "experienced" diver, but he still forgot his passport.

I dove at Truk Lagoon in 1979 with a "real" diver. When his mask imploded at 90 feet he made a panic ascent and suffered a massive lung embolism. He was dead before he got to the surface.

Off San Clemente Island, I saw another "experienced" diver go over the side without inflating his BC. To my knowledge he is still on the bottom.

Why am I receiving "vibes" from Dewing that he is using the terms "real" and "experienced" and "dive master baby sitters" as euphemisms for "macho"? In my humble opinion, the term "macho" in scuba diving means "reckless." Recklessness is stupid, irresponsible and oftentimes fatal.

You writers at PACIFIC DIVER, keep up the good work. Although I have made a few dives here and there and probably would be classified as a "real" diver by some, I enjoy all your articles and feel there is always a bit more to learn about this business we call diving.

Jake Vincente
Encinitas, CA

PD's Consistent in its Honesty About Opinions — and Biases

I want to thank you for the mention you made of Zeagle buoyancy systems in your "1990 DEMA Highlights" article (March/April '90 issue) and to compliment you on your magazine. You obviously spent a lot of time actually investigating and understanding a wide variety of products rather than just reprinting a few manufacturers' press releases. It's easy for those of us who have been in the diving business a while to be cynical about diving publications,

particularly when they write about diving equipment. We see how small, innovative and creative manufacturers are too often overlooked by a press which responds only to advertisers' dollars.

Equipment "reviews" are usually a rehash of advertisers' claims and are occasionally just plain false. PACIFIC DIVER, however, is consistently interesting, truthful and informative, and you're honest about your own opinions and biases.

Ron Russell
Manufacturer's Representative
Santa Barbara, CA

Astrolabe Reef IS Accessible Aboard the *Mollie Dean*

I enjoyed your article about Fiji (January/February 1990). However, there seems to be a continuing misconception about diving Fiji's Astrolabe Reef. The live-aboard *Pacific Nomad*, for reasons unknown to me, does not visit Astrolabe Reef. However, the live-aboard *Mollie Dean* does. I know this because I was on the *Mollie Dean* last October, and we enjoyed some spectacular diving on Astrolabe Reef. We were also welcomed ashore for a visit to a village on Ono Island.

Carl Roessler of See & Sea Travel (who books the *Pacific Nomad*) has been telling people that nobody is going to Astrolabe Reef, or that access is severely limited. I believe his statements are irresponsible at best. It takes nothing more than a phone call to Adventure Express in San Francisco to book a trip on the *Mollie Dean* heading for Astrolabe Reef. I have no financial connection with Adventure Express or to the *Mollie Dean* — I just want the diving community to have the facts.

Thank you for the opportunity to clarify this, and thanks for a great magazine devoted to the best diving the world: Pacific diving.

Lee F. Jones
San Jose, CA

More Kudos... We Love It!

Your magazine is without a doubt the best diving publication out today. Keep on printing those spearfishing articles! I do a lot of diving on the west coast of Baja. If I can help with any information, you know where to find me.

Rob Andrews
Escondido, CA

Letters to the editor should be addressed to: Editor, PACIFIC DIVER Magazine, P.O. Box 6218, Huntington Beach, CA 92615. Letters may be edited for clarity and space.

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Imagine then how warm you'd be in the 6mm SAS Titanium suit.

So come in from the cold. Walk into your nearest dive shop. And remember, the password is Titanium. By SAS.

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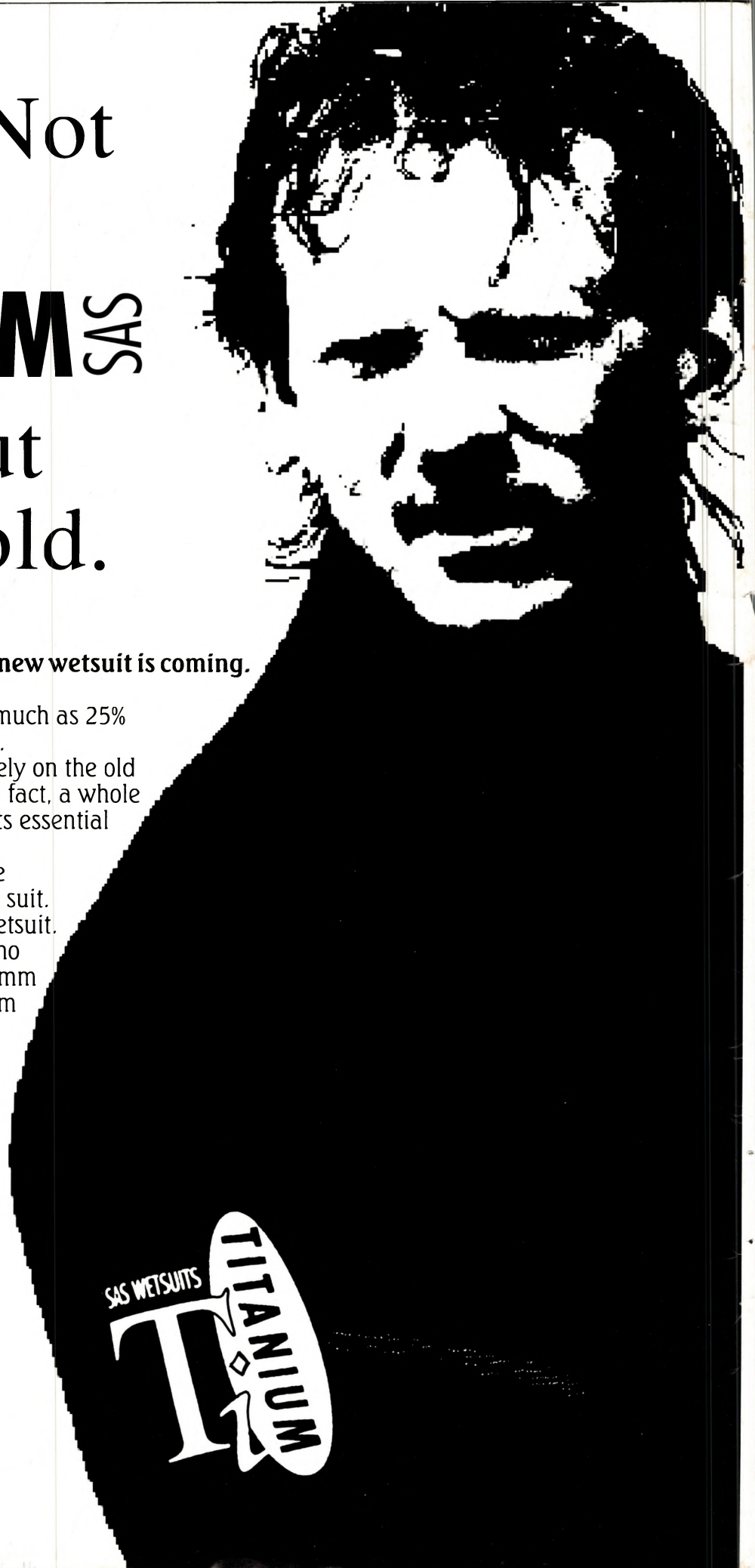
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Free diver Ted Heesen and his 63¼-pound catch.

Long Beach Neptunes Member Takes a Hefty White Sea Bass

Palos Verdes in the springtime is one of the best spots on the California coast for white sea bass, and Ted Heesen of Long Beach proved that last March when he shot a huge fish while out free diving. With a total length of 58 inches, it weighed in at 63¼ pounds.

Ted belongs to the Long Beach Neptunes, a club devoted to free diving and spearfishing, whose members have captured a number of spearfishing records over the years.

Santa Maria PADI Dive Center Raises Over \$11,000 for MDA

The Dive Shop of Santa Maria, a PADI 5-Star Dive Center, raised \$11,358 last April 21 and 22 during its 1st Annual "Dive-a-thon" to benefit the Muscular Dystrophy Association (MDA). As it turned out, The Dive Shop of Santa Maria's Dive-a-thon now ranks as one of the most successful MDA events ever put on by a member of the diving community.

More than 50 divers participated in three hours of underwater checkers, tricycle races and other games. Local merchants, the Sheriff's Dive Team and the Blue Ridge Band helped make the event a success by donating prizes as well as their time.

According to Ken Reinstadler, organizer of the Dive-a-thon, the success of the event has inspired The Dive Shop of Santa Maria to start making plans for a similar Dive-a-thon next year.

For more information on The Dive Shop of Santa Maria's Dive-a-thon, contact the shop at 1975-B South Broadway, Santa Maria, CA 93454.

"Dynamics of Decompression" Workshop Scheduled for Mid-July

On July 21, the California State University, Ocean Studies Institute, will host an all-day seminar entitled "Dynamics of Decompression" on the CSU Long Beach campus.

The workshop will feature decompression theory and computer experts Karl Huggins, author of the "no-bubble" tables from the University of Michigan, and Dr. Andy Pilmanis, former director of the Catalina Hyperbaric Chamber and current chief of the High Altitude Protection Function at the U.S. Air Force School of Aerospace Medicine.

Information to be covered in the seminar includes Dive Tables and Computers — what they actually do and what they don't do, information on the newest computers and tables available, "model-based" vs. "table-based" computers and the pros and cons of each, the latest information on the dynamics of bubble formation and considerations for deep air diving, oxygen decompression, Nitrox and tri-mix diving.

For more information call (213) 985-7588 or write to the Diving Safety Workshop,

CSULB, Ocean Studies Institute, Long Beach, CA 90840-3702.

Monterey's Hopkins Marine Station a Popular Marine Life Refuge

Monterey Bay is not only for recreational sport divers. The second oldest marine life refuge in California is located at Hopkins Marine Station in Pacific Grove. Established in 1931 as a marine life refuge, Hopkins is a field station for Stanford University and is dedicated to its research into the marine environment and its inhabitants.

In 1984, the area defined as the refuge was placed under the protection of the California Department of Fish & Game codes as to the taking of marine life. The refuge is now marked with orange buoys and is open to recreational divers. However, no marine life may be taken from within its boundaries.

Hopkins Marine Station has a wealth of information for scientific-oriented divers. If you are interested in obtaining any information on the refuge or on research diving in general, call Nicole Crane at (408) 373-0464 or write her at Hopkins Marine Station of Stanford University, Pacific Grove, CA 93950. (Continued)

Monterey Bay's 1990 Chocolate Abalone Dive the Biggest Yet!

The Aquarius Dive Shop's 6th Annual California Chocolate Abalone Dive had its largest turnout ever last spring. Al and Laurie Huelga, owners of the Aquarius Dive Shops and organizers of the Chocolate Abalone Dive, reported that there were 599 contestants out in the water off Monterey's Breakwater searching for the 400 confectionary mollusks.

In an event boasting 400 prizes worth over \$22,700, the grand prize of one week for two aboard the *Ocean Spirit* was won by Dave Clutts of Martinez. First prize of one week aboard the *Kona Aggressor* was won by Ben Tluhar of Modesto.

The primary beneficiaries of the event are the Pacific Grove Recompression Chamber, Divers Alert Network and the Muscular Dystrophy Foundation, which each received \$599, or one dollar from each contestant's entry fee.

Monterey "ab" hunters suit up to search for some sweet prizes.





New Monterey dive boat.

Beach Hopper II Joins Monterey Harbor Dive Boat Fleet

Marin Skin Diving has launched a new custom-built dive charter boat called *Beach Hopper II* which is operating out of Monterey Harbor. *Beach Hopper II* is a 30-foot dive vessel designed to carry up to 12 divers to the many dive sites in Monterey Bay as well as south to Point Sur.

Diver conveniences aboard *Beach Hopper II* include a walk-through transom to the swim step which has a heavy-duty ladder for exiting the water, bench seating and tank racks for 29 cylinders along the afterdeck and an enclosed hot shower. In addition to the normal safety equipment,

the vessel is equipped with a VHF radio, a cellular phone, a diver recall system and portable oxygen units.

The four captains who operate the boat in turn are all diving instructors, each with more than 15 years diving experience in the Monterey area. With their local knowledge, combined with radar, Loran navigation and a video depth sounder, they're able to get divers out to many unusual diving sites along the Monterey coast.

For more information about the *Beach Hopper II*, call Marin Skin Diving at (415) 479-4332.

Three Upcoming Photo Competitions From Los Angeles to Monterey

Three noted photo competitions in Los Angeles, Santa Barbara and Monterey are scheduled for the next few months.

Images '90: Focus on a National Treasure is the theme of the 3rd Annual Channel Islands National Marine Sanctuary photography contest. A top prize of \$1,000 will be awarded for the best image in the professional division and \$500 prizes will be awarded for the best images in both amateur and juvenile divisions. Other prizes include dive trips to the Channel Islands, Kodak film and gift certificates for photo and diving equipment. The deadline to enter is August 15. There is a \$5 entry fee per image and only 35mm slides will be accepted. For more information, call (805) 966-7107.

In September, the Northern California chapter of the Underwater Photographic Society (UPS) is sponsoring its 10th Annual California Beach Dive photo competition in Monterey on September 22 and 23. The entry fee of \$35 (or \$45 on the day of competition) includes dinner.

The competition begins on Saturday, the 22nd, at 8 a.m. when entrants are given one roll of 36 exposure slide film.

Entrants have until 2 p.m. to expose and return the film. On Saturday evening, while the film is being processed, entrants and their guests will attend a barbecue dinner where numerous door prizes will be awarded.

On Sunday morning entrants go to neighboring Carmel to select up to five of their slides for entry in one or more of the five competition categories. The judging takes place from 10 a.m. to 1 p.m. The presentation of winning slides and awards begins at 1:30 p.m. For more information contact Susan O'Sullivan at 2631 Shamrock Dr., San Pablo, CA 94806; (415) 724-2951.

Finally, October 10 is the deadline for entries in the Los Angeles UPS's 28th Annual International Underwater Photographic Competition. Over 100 entries will be awarded prizes in various categories, including wide angle, close-up wide angle, macro, black and white and creative free style and video.

Judging will be held at the Palos Verdes Art Center. Best of Show will receive a vacation for two at Grand Cayman. A variety of other monetary prizes, plaques and medallions will be awarded for first, second and third places. Selected prints will then be displayed November 6-17 at

the Los Angeles Maritime Museum. For more information, write to Carlos Lemmi, competition chairman, Underwater Photographic Society, P.O. Box 11366, Torrance, CA 90510.

Florida Dive Boat Makes its New Home in San Diego

Up until now San Diego divers have been able to dive on basically two types of dive boats: a 65-foot or larger full-day or multi-day boat which accommodates 20 to 30 divers, or a six-pak dive boat which handles groups of up to six divers.

Rich Cassens of R.C. Divers, former owner and operator of the six-pak dive vessel *America*, has recently presented San Diego divers with a third choice: he has just purchased the 40-foot dive boat *Endeavor* from Panama City Beach, Florida. Certified for 25 divers, San Diego's new dive boat is designed for intermediate-sized groups ranging from seven to 20 divers.

Renamed *America II*, the new dive vessel is docked at the Islandia Sportfishing Landing in Mission Bay. It specializes in half-day, two-tank dive trips Tuesday through Sunday to San Diego's Wreck Alley (see our story on Wreck Alley on page 37 of this issue) and the giant kelp forests off Point Loma. Tanks and weight-belts are provided.

For schedules and charter information on the *America II* turn to PACIFIC DIVER's Dive Boat Schedules (page 63 of this issue) or call Rich Cassens at (619) 584-0742.

Seattle Dive Club Helps DAN and Easter Seals with Easter "Egg" Hunt

The Marker Buoy Dive Club of Seattle sponsored an underwater Easter Egg hunt April 14 to benefit the Easter Seal Society and Divers Alert Network (DAN).

"Dive with the Seals" was the brainchild of Randy Williams, who also acted as the dive coordinator. Fifty-eight divers suited up on a drizzly morning to find some of the 389 brightly painted eggs (rocks, actually) scattered offshore. After the dive, the "eggs" were traded for numbered tickets which were used in a drawing for over \$1,000 in prizes.

Prizes included a hot pink aluminum 80 dive tank donated by Mike Hooley of Mares USA, dinners at local restaurants, dive trips on the M/V *Starfire* and M/V *Caldo*, an assortment of dive gear donated by Dan Kefler of Underwater Sports and, of course, solid chocolate Easter bunnies. The \$600 in proceeds was split between DAN and the Easter Seal Society.

(Continued)



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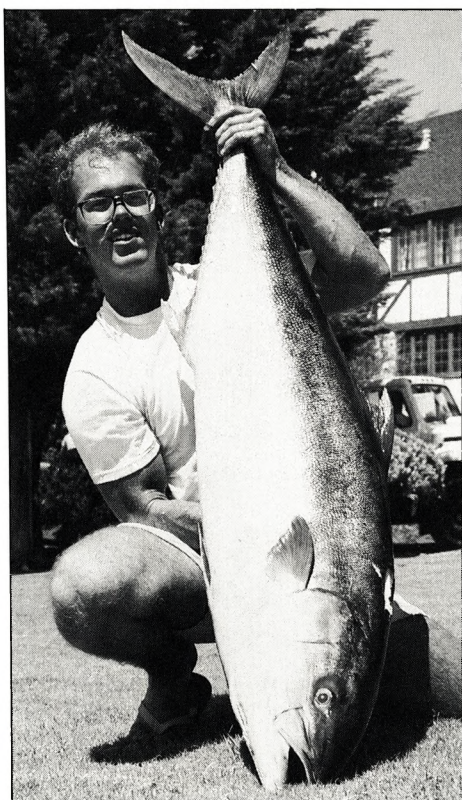
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It's 68.3 pounds, and a pending North American spearfishing record.

Monterey Bay Area is Now a "National Marine Sanctuary"

Representative Leon Panetta convinced Congress to require the National Oceanic and Atmospheric Administration (NOAA) to designate Monterey Bay a "National Marine Sanctuary." Such a designation qualifies the bay for permanent protection. The question, however, is what "type" of protection will it receive?

NOAA is presently developing a management plan that includes the

Spearfisherman Bags Record Yellowtail off La Jolla Coast

Free diving off the coast of La Jolla last May 21, Mark Steele of La Jolla bagged himself a monster yellowtail. The big yellow gave Mark the ride of his life as it towed him around the vicinity before wrapping itself up in a stand of kelp at a depth of 65 feet. Needless to say, it took considerable effort for Mark to free the fish from the kelp fronds and then drag it back to the beach. But it was worth all the trouble; it weighed in at 68.3 pounds at the Fisherman's Landing docks, a pending North American Spearfishing record.

economic uses of the bay and an inventory of the bay's unique marine life. After the plan draft is issued this spring, public hearings will be scheduled. When the hearings have concluded NOAA will rewrite the plan and release the final version to the governor of California and U.S. Secretary of Commerce for revision or final approval before the sanctuary designation is authorized.

More information on Monterey's sanctuary status can be obtained from the Center for Marine Conservation at (408) 375-4509.

Revised Edition of Northwest Shore Dives Now Available

Any visiting divers to the Pacific Northwest should check out the newly released revised edition of Steve Fischnaller's book, *Northwest Shore Dives*. Fifty public access dive sites around the Pacific Northwest are thoroughly examined with location maps and helpful information for safe, enjoyable diving. Each dive site is followed by an artist's illustration of an interesting fish or invertebrate likely to be encountered there.

Copies of the new edition are available at most Pacific Northwest dive stores or by writing Bio-Marine Images, P.O. Box 37, Edmonds, WA 98020.



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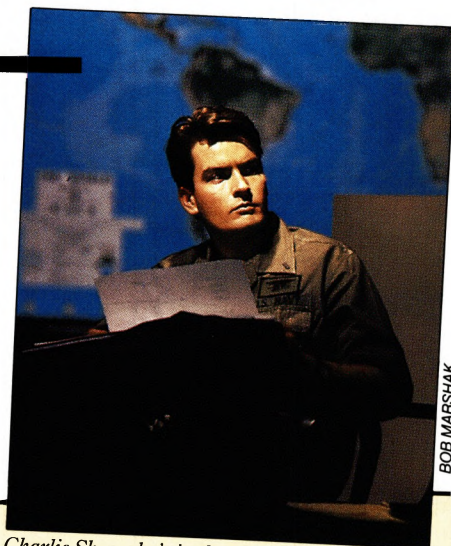
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DIVERS UPDATE

Pam Lambert Takes "Best of Show" at Sea '90 U/W Photo Competition

Local underwater photographers captured 16 of the top awards in the Sea '90 International Underwater Photography competition at the recent Seaviews dive show in Oakland. Pam Lambert of Fremont, California, won the amateur "Best of Show" for her close-up color print "Solitude," a jellyfish photographed in Jellyfish Lake in Palau.



Charlie Sheen: he's in the Navy now.

"Navy SEALS" Starring Charlie Sheen Scheduled to Open July 20

"Navy SEALS," a feature film chronicling the top secret operations of the Navy SEALs, one of the world's most elite — and lethally covert — fighting forces, is scheduled to arrive in movie theaters along the West Coast July 20.

Charlie Sheen ("Wall Street," "Platoon") and Michael Biehn ("The Abyss," "Aliens") star as best friends and leaders of a crack SEAL team. The action-adventure was filmed around Norfolk, Virginia, site of the world's largest naval base, as well as

along the Spanish Mediterranean Sea. The military portions of the production received limited courtesy cooperation from the U.S. Navy, allowing access to filming naval grounds and personnel.

The film is directed by Lewis Teague, whose previous works include the film "Jewel of the Nile," and promises to have plenty of topnotch diving scenes throughout. If anybody has a chance to see it, drop us a note and tell us what you thought of it from a diver's point of view.

Everything You've Ever Wanted to Know About Sharks Under One L.A. Roof

A major international exhibition about sharks, one of earth's most enduring creatures, opens at the Natural History Museum of Los Angeles July 1 and continues through September 23. *Sharks: Fact and Fantasy*, the largest, most comprehensive exhibition about sharks ever mounted, is being organized by the Natural History Museum and made possible by the generous support of the National Science Foundation. It will embark on a five-year tour of the United States and Canada following its Los Angeles debut.

Using a dive card as a guide, you first enter an underwater walk-through diorama, complete with sounds and smells, featuring life-size models of 17 shark species. Exiting the diorama, you have the opportunity to test your awareness of a variety of more than 370 shark species.

Sharks have been around for over 415 million years, and models of a number of fossil sharks are included in the exhibit, most spectacular of which is a cast of the jaws of *Carcharocles megalodon*. This shark is thought to have reached a length of 45

(Continued on page 18)

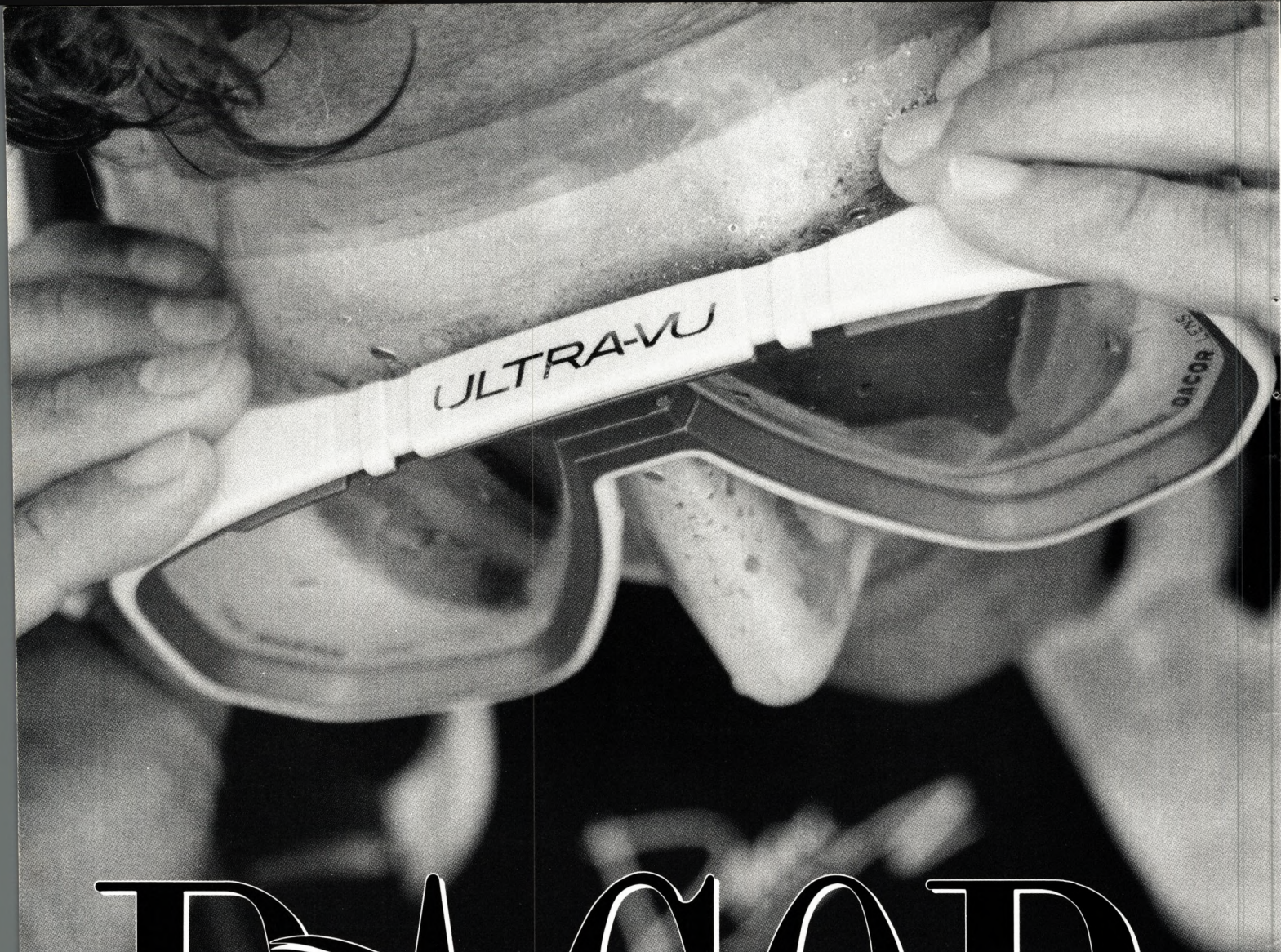
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DIVERS UPDATE

(Continued from page 15)

feet — a bit longer than a Greyhound bus. The jaws are so enormous the shark could have easily swallowed a small car.

A unique life-sized animated gray reef shark model encountering a mannequin in a submersible is an educational and entertaining highlight. It shows that sharks are not all that "unpredictable" by demonstrating a very refined series of postures gray reef sharks assume before attacking.

There is a section on anatomy that explains what makes a shark a shark using interactive sliding plexiglas anatomy panels, touch specimens and skeletal models. You can also see the kinds of things sharks eat displayed in a "seafood market," as well as an incredible variety of items found in the stomach of tiger sharks, such as hubcaps, license plates, aluminum cans, a horse skull, a 17th century French suit of armor, a propeller and much more.

Interactive demonstrations illustrate how sharks see, hear, smell and detect electricity, all the better to find their prey. Incidents where sharks were involved in solving murder cases and piracy are documented. In addition, shark conservation, behavior, shark attack prevention, anti-shark wetsuits, a walk-in shark cage, live shark embryos, a sea horse race track illustrating the odds of being attacked, sharks in culture and art, Gary Larson shark cartoons and shark gods (worshiped in some cultures) all are addressed in the exhibition.

A special ticket is required for the exhibition. Ticket prices are \$5 for adults, \$3 for students 12 to 17 and seniors over 62, \$1 for children 5 to 12, and children under five are free. Museum members receive two free tickets.

The Natural History Museum of Los Angeles County is located at 900 Exposition Blvd. in Exposition Park. For taped general information, call (213) 744-6292.

Fin Fest '90 Gives Divers a Taste of the San Juan Islands

The 4th Annual Fin Fest will be held October 5-7 in Friday Harbor in Washington's San Juan Islands. Fin Fest is an event for dive beginners and veterans alike. It is designed to familiarize divers with the superb diving found in the San Juans. Professional dive guides will be on hand, as will several charter boats, to take divers out to prime diving locations throughout the islands.

For more information, contact Emerald Seas Intl., P.O. Box 476, Friday Harbor, WA 98250; (206) 378-2772.



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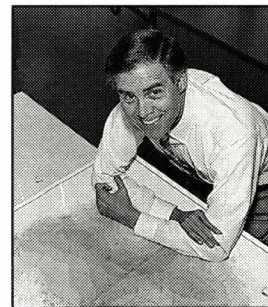
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The ocean's a silent world? Hardly! Pull your hood away from your ears and listen carefully — you may hear the low-frequency pulse of distant surf, or the clacks of wave-jostled rocks on a nearby cobble beach, or the continuous clicking or pounding of crustaceans. If they're nearby, you will hear the ticks and whistles of small whales, or the chuffing sounds sea lions make when they exhale. Add to that the drone of boat propellers and the rattle of your buddy's regulator and you sometimes have trouble hearing yourself think.

Pistol-Packing Shrimp

At one time or another most divers have probably wondered about the source of all this noise. Sometimes the creators are obvious (you could hardly miss a nearby dolphin), but usually they are more mysterious. The most noticeable sound — especially in warmer months — is a high-pitched snapping heard in water down to about 25 meters (80 feet). Sometimes the sound is only occasional, repeating a few times a minute; but more likely the metallic clicking is so rapid that the noise blends into a continuous hiss. The culprit is a truly wonderful little shrimp of genus *Alpheus*, a greenish-tan noisemaker commonly called the pistol shrimp. This reclusive but aptly named crustacean sports an extraordinarily large right or left pincer about half the size of its 2.5 to five centimeter (one to two inch) body. *Alpheus* uses this "pistol" to stun the small fish on which it feeds. Each shot is heard as a sharp snap. The more shrimp, the more snaps.

How this works makes a great story. Pistol shrimp live in little burrows on sand bottoms, among rocks, in larger tide pools, and even on pier pilings and boat floats. When a pistol shrimp is hungry, it will extend its long antenna from the mouth of the burrow to detect the slightest movement. Part of the big pincer looks almost exactly like the hammer of a gun. This hammer is pulled back to about 90 degrees and locked into place — the pistol is cocked. The inside surface of the pincer is a delicate pink color. When a curious fish

— usually a small goby — is attracted to the pink bait, the shrimp will trip the hammer which snaps back into place emitting a violent high-pitched pulse of sound. The loud concussion is sufficient to stun or even kill small fish! The shrimp pulls the unconscious or dead fish into the burrow to share with its mate for dinner, while larger fish hastily retreat to a respectful distance.

How intense is this sound? Snapping pistol shrimp can easily be heard all over a large marine laboratory. The snapping of the claw within your hand causes a painful stinging sensation. The concussive shock of the snap can be great enough to shatter aquarium glass! Researchers have discovered that the loud sound is not made by one finger of the claw striking the other, but by the rapid separation of two tiny microscopically smooth discs within the pincer. The cohesive force of an extremely thin layer of water trapped between these discs holds the pincer halves apart as muscle tension grows. When the tension exceeds a certain limit, the cohesive force is exceeded, the discs suddenly separate, and an explosive pop is generated. Hundreds or thousands of these shrimp, each hunting or repelling

actual (or imagined) enemies, contribute to that familiar background hiss. Another mystery solved.

Pile Drivers and Snorers

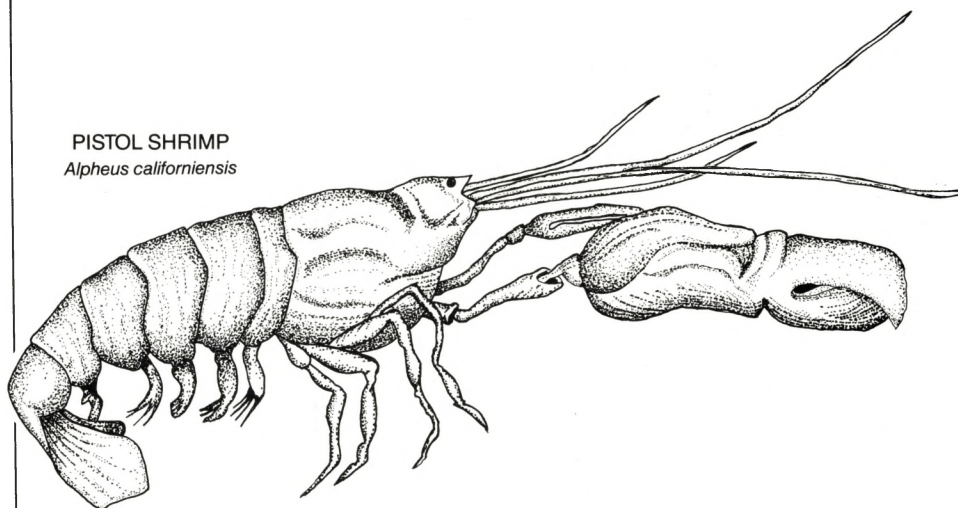
Much less common is the rhythmic thumping or rapping sometimes heard above quiet sandy-bottomed bays. Those who have heard the noise — usually through the hull of an anchored boat — say it sounds like somebody knocking on the hull. Though no one is yet certain which animals make the sound, likely candidates are mantis shrimp of genus *Hemisquilla*. These aggressive burrowing animals can grow to about 15 centimeters (six inches). Their homes have dense concrete-like walls, and the regular rapping is thought to be produced as the mantis shrimp pound the walls to compact the sand. The continuous tap-tap-tap of a busy bunch of mantis shrimp can drive live-aboard yachtsmen wild!

Lobsters can add to the din. Pacific lobsters sometimes make a rasping sound by scraping their antennae along their legs or bodies. The noises are most pronounced during the spring mating season. A few crabs make a similar sound by scraping special leg projections along the edges of their bodies.

(Continued)

ILLUSTRATION BY BILL JAENICKE

PISTOL SHRIMP
Alpheus californiensis



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Even fish make noises. A few species can clack or gnash their teeth to make clicking or buzzing sounds, and others can imitate a cricket's or locust's high-pitched keening. Still other fish, especially the croakers and grunts, make weird noises by twanging and thrumming their swim bladders. Diving near a school of croakers or grunts can make you think you've blundered into an underwater hog farm in full root. One of my favorite scientific names belongs to a croaker noted for its pig sounds — the yellowfin croaker is named *Umbrina roncadore*, the "shaded snorer."

"Seeing" With Sonar

Crews aboard surface ships and submarines employ active sonar (Sound Navigation And Ranging), the projection and return through water of short pulses — or "pings" — of high-frequency sound to search for objects in the ocean. Some of the sound from the transmitter bounces off any object larger than the wavelength of sound employed and returns to a microphone-like sensor. Signal processors then amplify the echo and reduce the frequency of the sound to within the range of human hearing. If you've seen *The Hunt for Red October*, you know an experienced sonar operator can tell the direction of the contact, its size and heading, and even something about its composition (whale or sub or school of fish) by analyzing the characteristics of the returned "ping."

Humans are not the only organisms to use sonar. Tailored clicks and whistles are used by whales to find food, avoid obstacles, and communicate. Some small whales can manipulate sound so expertly that they're able to differentiate between a vitamin pill and a similarly-sized bit of gravel, even when blindfolded. The clicks and whistles heard by divers are mainly used to detect fish for feeding, but how an individual within a hunting pod of dolphins can hear the returning echo of "his" fish amidst the cacophony of outgoing pulses from nearby colleagues is hard for me to understand. We clearly have much to learn about cetacean sonar.

Underwater Sound Propagation

All these natural and man-made sounds travel through the ocean about 4.5 times faster than they would travel through air; about 1,515 meters/sec (3,378 miles/hour). Sound energy decreases as it travels through seawater because of spreading, scattering, or absorption. Energy loss due to spreading is proportional to the square of the distance from the source. Scattering occurs as sound bounces off bubbles, suspended particles, organisms, the surface, the bottom, or other objects. Like light, the eventual fate of sound is absorption and conversion into heat by molecules.

Absorption of sound is proportional to the square of the frequency of the sound — higher frequencies are absorbed sooner. Sound waves can travel for much greater distances through water than light waves can before being absorbed. Because sound travels through water so efficiently, many marine animals use sound rather than light to "see" in the ocean.

Have you noticed that you don't hear in stereo underwater? Our normal sensation of stereo hearing depends in part on the difference in the arrival times of sound from one ear to the other. Because of the high speed of sound in water, our brain is unable to sense arrival time differences from noises originating nearby. You'd need to be four times as sensitive — or have a head four times as large — to hear stereophonically underwater.

Another peculiarity of oceanic sound has to do with the transmission of sound from air to water, or from water to air. Sound waves can make the transition from one medium to another with little energy loss only when the speeds of sound waves in the two different media are similar. The speeds of sound in water and air, however, are too different for an efficient transition to be made. This is why you can't hear people shouting from the deck of the dive boat while you're underwater, even though the weak sound of a grunting fish or a submerged pebble clicking against the side is very clear and sharp.

If you place a solid medium between air and water in which the speed of sound is intermediate, the sound can move across one junction, then the other, for a more efficient total transition. Wood works well for this, which explains why ocean noises are easy to hear in wooden boats. Even if the speed of sound in the intermediate medium is higher than in water (as in steel, for instance), some sound will be audible simply because the hard surface provides a good radiating surface for noises coming from the water.

Divers should be aware of all elements of the diving environment. An enriched understanding of the sounds of this not-so-silent underwater world will give you something new to enjoy on your next dive. Listen and concentrate on what you hear. □

Dr. Tom Garrison heads the Marine Science Department at Orange Coast College, the largest undergraduate teaching department for marine science in the U.S. He holds national awards for teaching excellence from the Marine Technology Society and the Salgo-Noren Foundation, coauthored the PBS series Oceanus, and is the author of a new text in general oceanography soon to be published by Wadsworth.

Equipment

DIVING TANKS

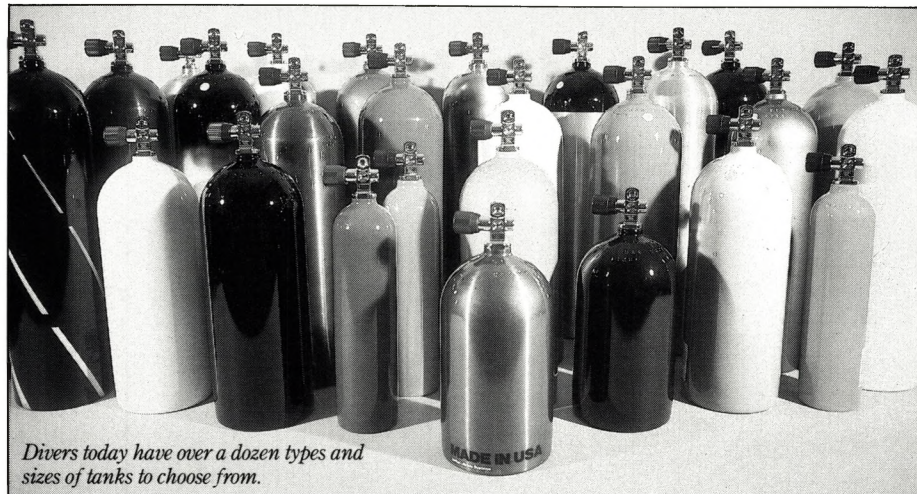
Today's variety of compact, higher pressure cylinders are a far cry from the steel 72s of yesterday.

The old adage that things were simpler in the "good old days" is something we all reflect upon from time to time. For example, remember when scuba tanks came in steel, and in only one size? That was back in 1950, when an enterprising young Frenchman named Jacques Yves Cousteau sold 10 units to Los Angeles-based Renee Sporting Goods.

As time passed, though, somebody decided that the perfect alloy for diving cylinders was aluminum and not steel. In 1971, U.S. Divers began to distribute a 72 cubic foot (2,475 psi) aluminum tank. Although these noncorrosive cylinders were well received by divers, the tank was not exactly "user friendly." Called the "Banana Tank" because of its elongated shape, this revolutionary cylinder did resist corrosive forces associated with salt water and steel, but it was long, unwieldy and incredibly buoyant (divers complained of being floated to the surface fins first).

Then in 1972, much to the alarm of many in the diving industry, U.S. Divers came out with its "Aluminum 80." This monster had the then-unheard of working pressure of 3,000 psi. Conservative experts at the time were convinced that the tank would certainly kill anyone who used it by blowing regulator yokes apart and providing so much air that divers would invariably come up bent. But the years past, nobody exploded, and eventually the aluminum 80 became the mainstay of the diving industry.

Times change, though, and with each passing year we seem to find life getting more complex. It's the same with diving cylinders. In the 1990s, the variety of tanks available for sport divers is staggering. Today divers in the market for a new diving cylinder find that the choice is not between a steel 72 and an aluminum 80, but between a 17, 30, 63, 67, 75, 80, Compact 80, Super 80, 90, 92, 94.6, 100, 102 and 120. Working pressures now range from 2,250 to 3,500, with the higher pressure tanks prompting the use of new valves (like the DIN) and high tech regulator yoke systems to accommodate them. It's enough to make you pull your hair out.



Divers today have over a dozen types and sizes of tanks to choose from.

At this point, tanks are still made of only steel and aluminum, but watch out! The engineers are hard at work, and if a reasonable solution is found to counteract certain buoyancy characteristics, ultra

lightweight spun-fiberglass cylinders (like those used in firefighting Scott Airpacks) will surely take the diving scene by storm — after all, who could possibly complain about a five-pound tank?

But for now, if you're looking for a new tank you must look at the advantages and disadvantages of the variety of high tech cylinders available today, in terms of tank composition, tank capacity and tank design.

Pressure and Volume: What Does it all Mean?

Cylinder "pressure" is expressed in pounds per square inch, or psi. This denotes the rating of maximum pressure the cylinder is certified to work at. All cylinders have their working pressures stamped up near their necks. Cylinder "volume," on the other hand, is the measurement of *how much* air is held within the tank, expressed in terms of cubic footage when the tank is filled to its maximum psi. This information is also stamped at the neck of most tanks, near the hydro date and serial numbers.

The type of tank, and its corresponding capacity, you choose should depend primarily upon what kind of diving you do. For example, although there are many exceptions, most dive boat compressors are still able to fill tanks to only 2,250 psi. Consequently, if most of your diving is done on boats, you might want to consider buying a tank with working pressures ranging near the 2,250 mark. On the other

Examples of Cylinders Available Today

Steel:

- *Sherwood Genesis 65 (65 cu.ft. when filled to 3,550 psi)
- *Sherwood Genesis 80 (80 cu.ft. when filled to 3,500 psi)
- *Sherwood Genesis 100 (100 cu.ft. when filled to 3,500 psi)
- *U.S.D. HP 102 (102 cu.ft. when filled to 3,500 psi)
- Scubapro 94.6 (94.6 cu.ft. when filled to 2,650 psi)

Aluminum:

- Dacor 63 (63 cu.ft. when filled to 3,000 psi)
- Dacor Super 80 (80 cu.ft. when filled to 3,000 psi)
- Dacor 92 (92 cu.ft. when filled to 3,200 psi)
- Dacor 100 (100 cu.ft. when filled to 3,300 psi)
- Luxfer 80 (80 cu.ft. when filled to 3,000 psi)
- Catalina 80 (80 cu.ft. when filled to 3,000 psi)
- Catalina 67 (67 cu.ft. when filled to 3,000 psi)
- **Catalina 80C (80 cu.ft. when filled to 3,300 psi)

* = DIN valve comes with the tank

** = DIN valve options are available

hand, if you normally fill your tanks at dive stores that have the capability to fill tanks to 3,000 psi and higher, then higher volume tanks might be more appropriate. However, what you want to try to avoid is dragging around a large cumbersome tank to places that are not capable of filling it to its maximum capacity.

Also, make sure that the capacity of the tank you choose matches the kind of diving you do. Deep-water wreck divers, for example, have different needs than photographers and sightseers cruising shallow kelp beds. Many Pacific Coast divers using one of the new large-capacity tanks at shallow depths will probably be forced up to the surface by the cold water before they run out of air. On the other hand, making a dive to depths deeper than 100 feet with only a steel 72 is not only going to cut your bottom time ex-

THE BIGGER YOU ARE, GENERALLY SPEAKING, THE MORE AIR YOU NEED TO FUNCTION. CONVERSELY, THE SMALLER YOU ARE, THE LESS AIR YOU NEED.

remely short, but it won't provide the needed air for any potential decompression situations that may arise.

Steel or Aluminum: How to Choose?

Steel or aluminum, which will it be? Each material has its own advantages, disadvantages, weight considerations, corrosive and maintenance factors and, of course, price.

Steel tanks, for example, remain negatively buoyant throughout the course of a dive, which is considered an advantage, while aluminum tanks have a tendency to become more buoyant as air is consumed.

This is especially noticeable if your dive is being concluded at depths of 15 to 25 feet. (Note: several aluminum tanks on today's market — such as the Dacor Super 80 and the Catalina Compact 80 — do in fact maintain negative buoyancy throughout the course of a dive.)

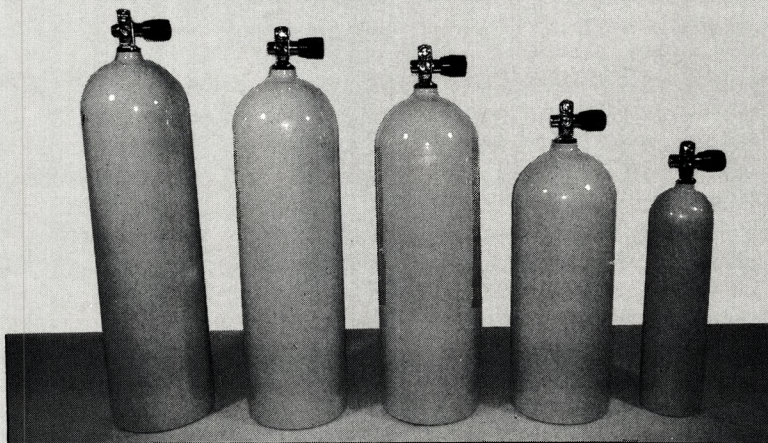
On the other hand, aluminum tanks are not subject to corrosion (although they can oxidize) like steel tanks, which can

Cylinder Care

Steel tanks are known for being prone to corrosion, but with the proper care given before, during and after a dive, they can last for decades without a speck of rust.

The important thing to remember in caring for your cylinders, whether steel or aluminum, is to never allow water to get inside them. You can accomplish this by always leaving at least 500 psi of air remaining in your tank to resist water entry.

Always have your tanks filled at a reputable air station. A careless "tank



jockey" (whether at sea or ashore) can easily blow water down the valve and inside the tank. If a cylinder is placed in a water-filled air station (the water keeps tank temperatures lower when filling them with compressed air) it is a good idea for the station operator to crack the tank valve open briefly (dispelling any droplets

near the orifice) and do the same to the fill whip. If the cylinder is being filled in a "dry" environment, the above precautions are not necessary.

Other important tank maintenance procedures are annual visual inspections and five-year hydrostatic tests. If significant rust is detected during a visual inspection, your dive store may recommend "tumbling" the tank to clean out any rust or contaminants. Any time your tank is tumbled, have your valve checked at the same time. If debris from the tank has worked up inside the valve it should be overhauled to

prevent residuals from blowing back inside a clean tank. The regulator should also be checked for contamination as well.

And don't forget, whether your tank is steel or aluminum, rinse it off with fresh water after use. Crack the valve when finished to removed residue drops of water from the orifice.

rust quite seriously unless carefully monitored.

Different Tanks for Different Divers

How much heavy metal do you want to carry around on your back? Weight is probably the most important "human engineering element" concerning today's scuba cylinders.

A five-foot, two-inch diver no longer needs to strap a huge aluminum 80 or 90 cubic foot tank to her body. Today there are a number of smaller cylinders, beyond the traditional steel 72, made for smaller divers.

Do smaller tanks provide enough air? The answer is yes. Think of it this way; the bigger you are (generally speaking), the larger your respiratory and circulatory systems, and the more air you need to function. Conversely, the smaller you are (generally speaking), the smaller your respiratory and circulatory systems, and the less air you need. That's why many female divers will come up from a dive with more air remaining in their tanks

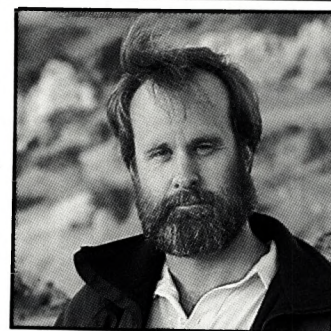
than their larger male dive buddies. So why carry around more tank than you need? Smaller divers should take advantage of today's more diverse cylinder market by using tanks that better match their body sizes and cut down on the corresponding weight they've been having to lug around up until now.

And How Much is All This Going to Cost?

At one time this was simple too. It used to be that, depending upon the valve, steel 72s ran about \$150 and aluminum 80s around \$120. Today, the price of steel has skyrocketed. It's easy to spend \$250 or more for a steel cylinder system. However, basic aluminum 80s have so saturated sport diving that you can still find them for from \$100 to \$120. The myriad new tanks on the market range from \$130 to \$200 and up. Pick the one that best suits your size, the type of diving you do and how you spend your time at depth, and then hit the water. With the right tank, diving becomes just that much more fun. □

PIONEERS OF A NEW SCIENCE

The most important oceanographic discoveries have occurred in only the last 25 years.



The ocean is motion. Storms scour the surface, generating currents and waves. Beneath the surface water masses rise and sink, propelled by variations of density and temperature. Ocean, atmosphere and sun are engaged in a dynamic relationship transferring heat and water around the planet. To study something that is constantly moving and changing, and that covers fully three-quarters of the earth's surface, has been a most difficult challenge throughout the ages.

The First Pacific Expedition: The Voyage of Captain Cook

In 1768, a good 200 years after explorers had started studying the Atlantic, Captain James Cook sailed into the Pacific with instructions to survey islands and coastlines and update existing charts. In addition, he was commissioned to find a mythical southern continent called *Terra Australis Incognita* and claim it for the British Crown. The presence of this land mass had been theoretically postulated by cartographer Gerardus Mercator who believed the surface of the earth was made up of 50 percent land and 50 percent water. To get his theory to work he knew there had to be another continent out in the unexplored region near the South Pole, and he wanted Cook to find it.

Captain Cook spent 10 years and three expeditions crisscrossing the Pacific, taking soundings, recording current and wind speeds and measuring water temperatures. He circumnavigated New Zealand, proving it was a pair of islands and not a peninsula. He sailed farther south than anyone before him, crossing the Antarctic Circle and maintaining a poleward course until the ice pack finally stopped him. By the time of Cook's death in 1779 at the hands of the Hawaiians, he had charted all of the Pacific's major components.

While Cook was out nosing around in the Pacific, Ben Franklin was busy figuring out where the Atlantic Gulf Stream was by measuring seawater temperatures. And French chemist Antoine Lavoisier had managed to isolate sodium chloride and four other salts in seawater, which

prompted Napoleon to send out two research ships on a round-the-world oceanic expedition.

Over the course of the following 50 years other expeditions were sent out to study plant and animal life and the mineralogy and cultures on the faraway Pacific islands. (The United States, for example, made studies of the Japan Current, the Pacific Ocean's counterpart to the Gulf Stream.) But the era's most productive American hydrographer made his contribution to charting the movements of the world's oceans without ever leaving his desk in Washington.

Matthew Maury: The Armchair Oceanographer

Matthew Fontaine Maury was a navigator in the U.S. Navy when an injury left him with such a bad limp that he could no longer serve aboard an ocean-going ship. Consequently, he was moved ashore and made superintendent of the Navy's charts department, the agency which was also responsible for cataloging all shipping logs. Saddled with the responsibility of updating Navy charts, it soon

became apparent that there was just too little information to adequately accomplish his assignment. Then he realized that the source of the information he needed to do a good job was right in front of him, in the piles of ships' logbooks that passed through his office.

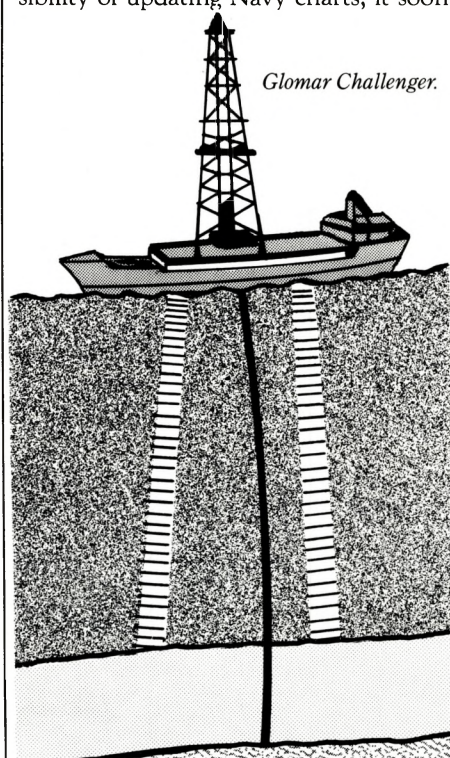
He and his assistants began the laborious process of checking each log for current and wind information. Then he devised a new type of logbook with special spaces to note information on wind, currents and water and air temperatures. In addition, he had ocean-going sailors drop corked bottles overboard all over the world, each with a note inside listing their ships' positions at the time, along with a request for the finders of the bottles to contact Maury. In this way he eventually compiled enough information to publish the first edition of *Wind and Current Charts* in 1847.

The Historic Voyage of the H.M.S. Challenger

Probably one of the most productive oceanographic expeditions in history was the voyage of England's *H.M.S. Challenger* in December, 1872. Equipped with both steam and sail, she was a warship that had been stripped of all but two guns to make room for a seagoing laboratory. The Royal Navy had previously sponsored other expeditions (i.e. the voyages of Captain Cook) and public enthusiasm for these scientific sojourns was at an all-time high. What's more, popular interest in the ocean floor had been further stimulated by the laying of the Atlantic telegraph and the invention of machines like the steam-powered winch which made it possible to handle heavy research equipment while at sea.

The *Challenger* studied surface movements of the oceans as well as marine life and the physical characteristics of various depths. The ship was fitted out below decks with a zoological laboratory for examining specimens brought up from the sea as well as a library, workrooms and staterooms for the six scientists aboard.

For its day the *Challenger* was a technological wonder. One of the newer instruments on board was a thermometer



Glomar Challenger.

that enabled researchers to take readings on or near the ocean bottom. Previous thermometers had distorted readings due to the high pressures at depth. But these new deep-sea thermometers were sheathed in copper tubing which protected them from destructive pressures.

Using these gauges, the scientists of the *Challenger* made significant findings such as the discovery of the deep bottom water that flows toward the equator from the Antarctic's southern oceans.

In addition to the physical properties of ocean water, the scientists studied the

chemical properties as well. They isolated 27 elements in seawater and discovered that the ratio of these salts to one another remained virtually constant across the surfaces of all oceans. Later, with water samples drawn from as deep as 6,000 feet they were able to extend the "consistency of seawater" theory all the way to the bottom of the ocean.

Finally, using a conventional rope and a steam-driven winch, the *Challenger* was able to measure the depth of the Pacific Ocean's Marianas Trench when the measurement device eventually hit bottom

at 26,850 feet — more than five miles deep!

Marine biology also took a great leap forward with the *Challenger's* voyage. Scientists collected 4,417 new species of plants and animals. They dredged 133 samples from the ocean bottom, some of them from depths of 2,000 feet.

The scientists had hoped to find out how deep the sea really was. Their sounding in the Pacific was the world's record at that time. They had also hoped to learn if seawater was the same in all oceans, and whether prehistoric animals still lived in the ocean's great depths. As a result of the *Challenger's* studies they were able to state categorically that there was life in the sea at every depth; that the ocean floor was not flat but actually contained mountain ranges; that all seawater was chemically the same; and that the species of marine life yet to be classified ran into the thousands.

Some of the ocean cores retrieved by the *Challenger* over 100 years ago are still being studied today. The *Challenger* gave mankind a new picture of the sea by adding to it a third dimension: depth.

The Continental Drift Theory is Born and Scorned

As far back as 1620, 100 years after Magellan had circumnavigated the globe, scientists of the day noticed the remarkable fit between the coastlines of Africa and South America. It was Sir Francis Bacon who first suggested that perhaps they had once been joined together, but the idea lay dormant for some 300 years.

Then in 1915, Alfred Wegener, on the basis of extensive evidence from geology and paleontology showing astounding similarities between the continents, suggested that all the lands in the world had once been joined together in one great body, which he named *Pangaea*. He was ridiculed by geologists of his day who said that no force was capable of moving such immense masses of land. They just couldn't envision whole continents floating around on the globe.

But at about the same time Wegener was being scorned by his colleagues, two Englishmen, Robert Scott and Ernest Shackleton, found beds of coal, known to be formed in semi-tropical swamps, on the Antarctic continent. This event had little effect on the rigid geologic positions of conservative geologists of that day, but it was later to become of major importance in settling the Continental Drift controversy.

At the time, the Continental Drift theory was explained by the unproved hypothesis stating that in the past the earth's axis had shifted and thus the North and South Poles had moved. But it was just a theory and little attention was paid



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to it, at least not until scientists were able to develop a clear picture of the topography beneath the sea.

Undersea Pictures Answer Age-Old Drift Questions

Beginning with the *H. M. S. Challenger*, most of the research ships dredged samples from the bottom with coring devices that originated as simple tools similar to apple corers and developed over the years into sophisticated piston-core apparatus capable of bringing up samples from 100 feet beneath the ocean floor.

On the original *Challenger* all soundings were laboriously taken by dropping long, leaded lines. But in 1922, the German research ship *Meteor* became the first scientific vessel to use a sonic depth finder that could take soundings made without lead line, and while the ship was moving. This new device revolutionized oceanography and as more and more ships began to explore the depths sonically, more of the ocean bottom topography began to be constructed on submarine maps. Without ever having seen what they were describing, oceanographers began to speak of abyssal plains, escarpments (cliffs), sea-mounts and guyots (buried mountains), fractures, canyons and trenches. Once again the development of a new tool had changed the face of oceanography. By the time the *Glomar Challenger* left port in the 1960s to study what was beneath the ocean floor, scientists already had a pretty clear picture what the surface of the ocean floor looked like.

Glomar Challenger Explores Beneath the Sea Floor

The *Glomar Challenger* was basically a ship built around an oil rig. When this strange looking vessel set sail in 1968, the first thing its residing scientists wanted to prove was the Continental Drift theory. So during the first leg of its expedition the *Glomar Challenger* crossed the Atlantic between South America and Africa, pausing nine times to drill holes in the sediment and crust of the ocean floor.

What they found was confirmation that the Atlantic Ocean was spreading outward on a volcanic conveyor belt system along an underwater mountain ridge that ran down its center, pushing the continents apart. Sediments got thicker and the rocks got older as they moved away from the ridge. This proved that the Atlantic Ocean was young, no more than 200 million years old, and that North America and Europe were once joined together.

It was also in the Atlantic Ocean that *Glomar Challenger* scientists discovered the reversals in magnetism in the volcanic sea floor. This led to new discoveries about

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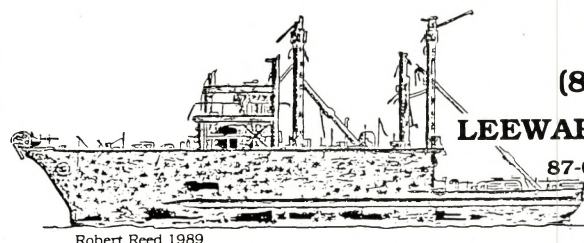
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the shifting of the magnetic field of earth throughout geologic history.

By the time the *Glomar Challenger* got to the Pacific Ocean things started getting complicated. Experiments proved that the Pacific was no older than the Atlantic and that it had been similarly spreading. But there were different reasons why the Pacific Ocean's crust appeared so young. The westing of North and South America away from Europe and Africa had destroyed half of the ancient Pacific's sea floor. In addition, deep ocean trenches were found to be swallowing up this migrating ocean crust, melting it, and then forming strings of active volcanos. This discovery finally enabled mankind to scientifically explain volcanos.

PROVING THAT THE
PACIFIC OCEAN PLATE WAS
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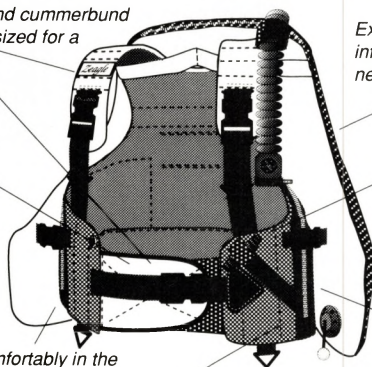


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Scientists had discovered that the Atlantic and Pacific Oceans had once joined where Central America is today and that the Pacific Ocean plate was now moving to the northwest, proving that the continents were still "drifting." It was the beginning of a new era in Earth Science. And it happened only a little over 20 years ago.

Lack of knowledge spawns ignorance, and ignorance usually transmutes itself into fear. For thousands of years man feared the sea, because he did not know the sea. Scientists and adventurers who explored the sea sought to "fill in the blanks" of our knowledge of our oceans.

The *Challenger* of the 1870s changed mankind's oceanic vision as a third dimension was added to the picture, that of depth. The *Glomar Challenger* increased our oceanic vision once again by adding a fourth dimension: time.

We are really only now on the threshold of oceanic exploration; who knows what next dimension will be added to the equation, or when it will appear. □

Rick Baker studied marine geology at the Moss Landing Institute at Moss Landing, California, and holds degrees in chemical oceanography and geology.

PACIFIC

DIVING

A reef fish sits still long enough to be captured in this shot at Cherry Cove, Catalina Island. Photo by John Cheverton of La Habra, California. ▶



Garibaldi scoots along a rocky reef at San Diego's Point Loma kelp beds. Photo by Preston Kuntz of Alhambra, California. ▲



▲ Large group of Pisaster sea stars gorges on waste fish found under a commercial fishing wharf. Photo by David Wrobel of Monterey, California.



▲ A blood star (*Henricia leviuscula*) and red gorgonian coral (*Lophogorgia chilensis*) brighten a reef off Anacapa Island. Photo by Greg Volger of San Diego, California.

(Continued)

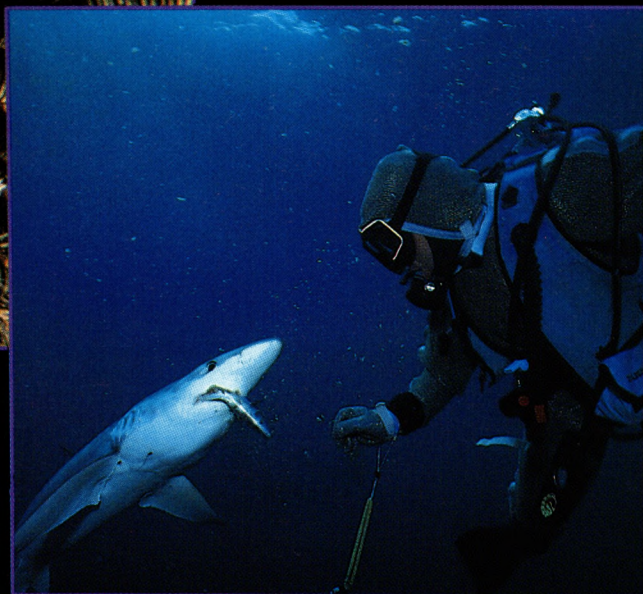
PICTORIAL

PACIFIC DIVING



▲ A crinoid looking like an underwater palm tree, taken on a night dive in Palau on the Ngemeles drop-off with a Nikonos V and close-up lens at 1/90th, F22, using manual strobe control and Kodachrome 64 film. Photo by Stephen Benavides of Irvine, California.

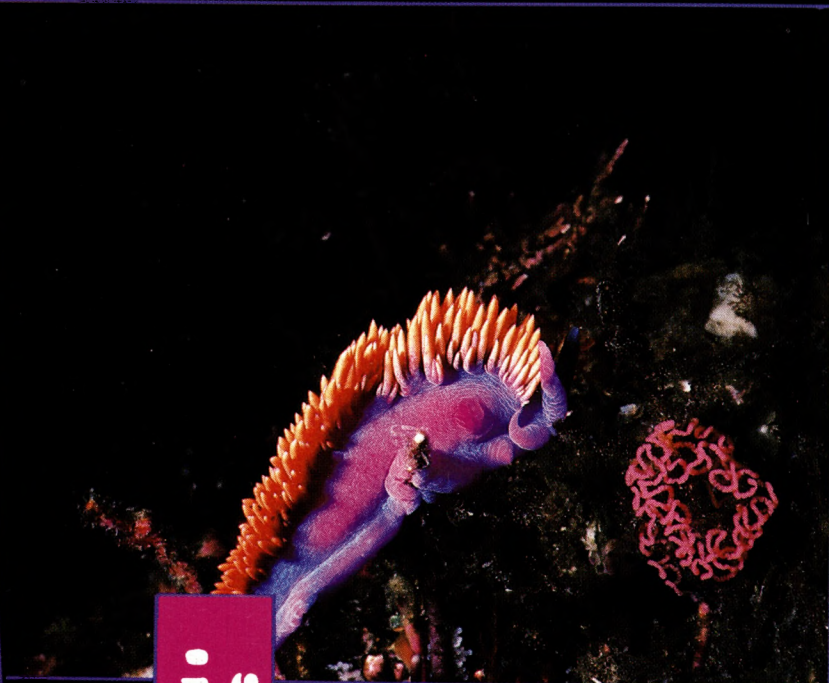
Blue shark feeds on bait offered to it by a "shark-suit" diver, approximately 15 miles off the coast of San Diego. Photo by Chris Huss of Seattle, Washington.



Spanish shawl spends the night on a rock next to an egg mass off Anacapa Island. Photo by Ron Owen of Napa, California.



▲ Diana Francis sits in the clear waters of Cod Hole at Australia's Great Barrier Reef. Photo by Rob Wilder of Santa Barbara, California.



if

you've taken photographs that you feel represent the diving lifestyle, and you'd like to share them with other divers, we invite you to submit them to PACIFIC DIVER for possible publication.

PICTORIAL

Cascade of purple hydrocoral adorn an already colorful reef off Eel Point, San Clemente Island. Photo by Bob Lynn of Orange, California. ▶



Bull sea lion wags his head menacingly at approaching photographers at Monterey's Breakwater. Photo by Rufino Montalvan Jr. of Vallejo, California. ▲

Curious harbor seal sneaks through a stand of kelp to spy on photographers at the Coronado Islands. Photo by Kenneth Corben of Cardiff, California. ▶



Pair of black surfperch feed in a stand of California kelp. Photo by Diego Lirman of Manhattan Beach, California. ▲

If your photo is selected, it will appear on these pages with a photo credit (\$25 will be awarded for selected photographs). To have your photos considered for publication, send your color transparencies to Editor, PACIFIC DIVER Magazine, P.O. Box 6218, Huntington Beach, CA 92615, with a sentence or two describing each shot. Photos must be submitted with a self-addressed stamped envelope to ensure their return.

AN EVENING SPENT WITH SQUID

By Ralph Bryan, San Diego, California

As my dive buddy Erick and I entered the dark, cold water from the beach at the La Jolla underwater park, we could feel the excitement pulsing all around us. There were shouts coming from a boat all lit up in the distance. Sea gulls swarmed like huge moths around the boat, squawking loudly. Somewhere in the darkness we could also hear the faint barking of sea lions. As we kicked slowly out toward the mouth of the La Jolla Canyon, we knew that all this nighttime excitement could only mean one thing — squid.

Almost every year between December and February thousands of squid come up from deeper water to mate in a ceremony that can only be described as frenzied. You might see as many as three or four male squid attempting to attach themselves to one female. Once one is attached, it reaches a long tentacle into the female and deposits its sperm. She then lays an egg sac containing about 100 eggs. Each female can produce as many as 12 egg sacs over a period of about a month. At the end of that time, the squid return to deeper water to die.

Once we reached the spot we had planned to dive we took a breather on the surface, then descended to about 60 feet. Since squid are very near the bottom of the food chain, we found a variety of fish and mammals congregated to feast on the squid and their eggs. Erick noticed an extremely bloated fish and tried to point it out to me, but I was already lining up my strobes to take a photo of a little red sculpin. This fish's eyes were obviously bigger than its stomach because it sat there on the bottom with a large, half eaten squid protruding from its mouth. After a few unsuccessful attempts at swallowing, it spit out the squid. You could almost hear it burping.

Sea lions were out in force; occasionally one would buzz past us with a squid clenched in its teeth. Bat rays swarmed the feeding area as well and seemed to be



Thousands of squid come up from deeper water to join in a frenzied mating ceremony.

attracted to our dive lights. They'd fly toward us out of the darkness, come within inches and then twist their wings and turn away. When the bat rays weren't flying around us, we found them laying on the bottom with their heads buried in the carpet of squid eggs, eating to their hearts content.

The edge of the underwater canyon was where all the action was taking place. We saw thousands, maybe millions, of squid all engaged in their annual mating ritual. When they moved, they moved in a mass, in one direction but at different angles to each other. The sensation this created reminded me of the time I walked through New York City on one of the busiest shopping days of the year (except I didn't see any New Yorkers actually mating, and I doubt any of them were laying eggs — although in New York you can never be sure).

Halfway through the dive, Erick and I heard the loud rumble of a boat generator directly above us. I looked up and saw the bright lights from a squid fishing boat penetrating the dark water. From our position on the bottom we watched clouds of

squid surfacing, drawn to the powerful lights. All of a sudden I was reminded of the movie *Close Encounters*; I swear I could even hear the music — *Boop-beep-boop-bomp-bomp*.

I ran out of film quickly, and spent the remainder of my dive in about 15 feet of water engulfed by squid and the lights from the boat. And then it was time to end the dive. Erick and I reluctantly surfaced about 20 yards from the boat, watched the squid fishermen dip their large nets into the water and pull up scoopfuls of squid, then slowly we kicked back toward shore. We were both disappointed that it was over, but excited because this was a dive we would remember forever. □

Do you have something in your logbook that you'd like to share with other divers? If so, send it to LOGBOOK, c/o PACIFIC DIVER, P.O. Box 6218, Huntington Beach, CA 92615. A self-addressed, stamped envelope must be included to ensure the return of any photographs. A \$25 award will be given for any stories selected for publication.

What's Killing our Abalone?

An ecological crisis exists with our ab populations. Theories abound, but the bottom line is, nobody seems to know what's happening or what to do about it.

Article by Joni Dahlstrom

Photo by Adam Zetter

Abalone are in trouble. To experienced divers, this is the understatement of the century. Southern California's abalone stocks have been declining steadily for at least the past 20 years.

But there's something else going on, and it presents a scary picture. While abalone in general have been becoming increasingly rare due to harvesting and deteriorating water quality, for a long time the black ab was busily overpopulating itself along the tidal zone of the northern Channel Islands. (Until 1984, there were special restrictions preventing the harvesting of abalone in less than 20 feet of water, which is the primary habitat of blacks.) For this particular abalone species, the future appeared to be bright.

Then the reports started coming in from divers. Shriveled and shrunken black abs were rolling about in the surf zone, apparently unable to cling to rocks. Observation plots monitored by divers with the National Park Service confirmed the bad news. Black abs were dying off.

In 1985, Park Service divers counted approximately 50 black abalone per square meter at Anacapa Island. By spring of 1989, that figure had plunged to two. At Santa Barbara Island, the number of abalone per square meter fell from 10 to one. At Santa Rosa Island, from 46 to eight.

Even worse, the abalone that managed to survive were 10 to 40 percent underweight, and they appeared to be weak.

Not only had many abalone simply died over the span of a few short years, but the remaining population was hanging by a thread.

And to this day, no one knows why.

"The first question we asked was, 'Is harvesting causing this?'" Gary Davies, head biologist at Channel Islands National Park, remembers. "But we saw the die-off in areas that were closed to harvesting, and we saw it affecting not just legal-sized abs but all sizes." Apparently, even the small abalone, only a few inches in diameter, were scarce.

"The real difficulty," says Davies, "is that

What do we know about abalone beyond growth rates and reproduction? At this point, almost nothing.



today our knowledge of marine ecosystems is on a par with 15th Century human medicine. We are about on the level of discovering the circulatory system in the human body. We notice something is wrong and we begin our studies, and then we are faced with the question, 'What's normal?'"

That is the question. And it applies not only to abalone, but to most of the species living in the near-shore ecosystem. Who knows what crucial role nudibranchs, starfish, gobies, tube worms and other non-game fish species may play in the environment? The only thing that can be said with certainty is that the ocean community is a complex web, with every species linked to the survival and health of the system.

A closer look at the search for the cause of the death of black abalone reveals how delicate the near-shore ecosystem is, and how little we know about it. When the cause of a problem can be directly traced to man's actions, it is a relatively simple matter to fix. At the very least we have the knowledge to deal with the problem.

But what do we know about abalone beyond collected data on growth rates and reproduction? At this point, almost nothing.

There is almost no data on what toxins will kill abs. There is no data on how low levels of pollutants affect the young. There is no data on parasites that would enable researchers to distinguish between benign and deadly forms of infestation. Why are abs getting sick?

Researchers at the California Department of Fish and Game found a parasite in abalone kidneys which at first looked like a promising lead. But it was a blind alley; they found the same parasite in healthy animals.

Another potential lead that has proven false was starvation due to overpopulation. With no natural predators, including divers, black abs had grown incredibly dense. But when sick animals were removed and given plenty of food, they did not recover. Though the abs that were transferred to laboratories were eating, they still lost weight. Clearly, this was not a simple case of overpopulation leading to a scarcity of food.

While it is believed that the black ab is the species most affected, it is possible that other species living in deeper water are affected as well, but they are not as obvious because there are fewer of them and they are less noticeable. It may be that other ab species that become sick are washed away before they are noticed by divers.

Now researchers are focusing on environmental factors. Temperature may be a key component. The areas where the die-offs are prominent are out at the Channel Islands and in a plume of warm water south of the Diablo Canyon nuclear reactor. The two areas are unrelated except for the fact that both areas have warm water.

"There are so many factors that might be involved," says Carol Friedman, a research biologist at the Department of

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Fish and Game. "Air temperature may also be a culprit. The blacks are totally exposed to air when the tide is out, and we've had several warm years. So blacks may be more sensitive to air temperatures than other abs."

The best picture of what is occurring suggests that a combination of factors have affected the abalone. At first, the abs were overpopulated, but they were holding their own. Then there were the strong storms of 1982 and 1983, which washed 80 percent of the kelp canopy onto the beach. Then the warm waters brought in by El Nino inhibited the regrowth of kelp.

The storms and El Nino created a situation where there was a sudden abundance of food algae in the black abalone territory, and then there was none. Food came into the shoreline in pulses. That alone would not have caused so many abalone to die, but it may have weakened them.

The abalone syndrome can be pictured as a feedback loop. Abalone became overpopulated, went through a period of food scarcity and because of it may have quit reproducing, which is one of the first signs of a physically stressed animal. Because of their weakened condition, they contracted kidney parasites. This led to more physical stress, which led to more parasites. It's a loop that's almost impossible for any individual wild animal to work its way out of, due to predators and competition.

So far, this scenario leaves divers blameless. After all, we can't be held responsible for El Ninos. But man does play a part in the system by changing the balance between species.

For example, there was an explosion in the sea urchin population, specifically purple and white urchins (the reds are harvested by divers so their numbers are kept in check). Urchins and abalone compete for both food and space on the near-shore reefs. Urchins are better able to cope with sudden food surpluses and shortages than abs. When there is little food, an urchin simply goes into stasis, a condition in which they expend so little energy they can practically survive off of the nutrients in the water. This puts abs at a severe disadvantage, because they must have a constant food supply.

Part of the reason urchins are overpopulated is the lack of natural predators. Some of the species that eat urchins and control their numbers are starfish, lobsters and sheephead. (In 1982 and 1983, the starfish population on the South Coast crashed for no apparent reason.) As these three important species become scarce because of man's harvesting them, there is no control on the urchin population. The entire system is thrown off balance.

According to Davies, there are two ways nature controls populations. One is competition. Species expand until they use up all of the available resources. There are big swings in the numbers of animals, with the population growing beyond its limits, and then dying off to previous levels.

The other natural control is predation. A population controlled by predation does not have the same huge swings, because it sustains itself by reproducing a bit more than the predators will eat. As a species becomes scarce, predators move out of the area or target another source food. When the population is overabundant, the predators take advantage of it. The predation system leads to stability and a greater diversity of species.

"What we are seeing are the results of a process that began at least 30 years ago," says Davies. "We (fishermen and divers) removed the predators, and that could be the primary factor in the destabilization of this system. In the future we can expect to see a fair amount of major disruption. And abalone aren't very well adapted to these big swings."

This may not offer much of a solution to the abalone crisis, but the fate of abalone is not an isolated event. The root of the die-off is not elusive, it only seems that way when researchers hunt for a specific bug or virus or toxin. In all likelihood, abalone are dying because their world has been thrown out of whack.

It took millions of years for the near-shore ecosystem to reach the delicate balance that divers discovered 30 years ago. Now that system has been changed. Many species will become overpopulated, then disappear. Abalone may be the first victims.

As divers, we must rethink our place in the ocean environment. For now, there is no quick-fix solution, there is no pill that will right a reef system. Restoring abalone, if it's possible, will take time and a variety of controls that may already be too late in coming or impossible to implement. But we must act before the events become commonplace. We need more information and a new way of managing the ocean as a complete ecosystem, rather than merely looking at the health of a dozen game species. Mostly we need time, a luxury we may not have much of.

In the end, this is less a story about abalone than one of the fragility of nature and how powerless we really are in the face of it. □

Joni Dahlstrom is PACIFIC DIVER's editor-at-large.

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The Strait of Juan de Fuca

Article and photos by F. Stuart Westmorland

Standing atop the remote cliffs of Cape Flattery on the Olympic Peninsula, the northwestern-most point of land within the continental United States, there unfolds before you a spectacular panoramic view. Looking south, giant rock outcroppings rise offshore amidst swirling Pacific surf. Twenty miles north the mountains of Canada's Vancouver Island tumble down into the sea. And in between is the mouth of the Strait of Juan de Fuca, the connecting channel between the Pacific Ocean and Puget Sound's vast inland sea where is found some of the most spectacular diving in Washington.

However, the Olympic Peninsula itself has its own share of spectacular diving. The 90 miles or so of scenic coastline along Washington's northern edge, from Cape Flattery eastward to Port Townsend, offers a surprising variety of dive sites, from eye-popping open water pinnacles to sheltered, easily accessible shore dives.

NEAH BAY: PRIME GROUNDS FOR RUGGED DIVERS

For example, take a look at Neah Bay. Only eight miles from Cape Flattery, Neah Bay is a Makah Indian community famous for its record-size salmon catches. Its direct exposure to the Pacific Ocean makes diving around Neah Bay seasonal at best (when the fog finally lifts), but on those rare calm days you can get a taste of some rare world-class diving.

One of the most popular dive sites in the area is Duncan Rock, a wave-battered pinnacle northwest of Tatoosh Island. The ultimate status among Washington divers is comparing how many successful descents have been made on this revered rock. Just beneath the stomach-retching surge are unbelievable caves, arches and

crevices. The range and diversity of invertebrates and fish are overwhelming. It is impossible to touch the bottom without disturbing several layers of marine life.

Duncan Rock is both "heaven" and "hell" for underwater photographers. Trying to maneuver in the ever-present surge is like lurching around in a washing machine, making it difficult enough to keep straight which way is up, much less focus a camera. So many otherwise stalwart photographers have decided that some pictures are best enjoyed in the mind, and they leave their cameras topside and get into the powerful ebb and flow of the surge and enjoy an outstanding dive.

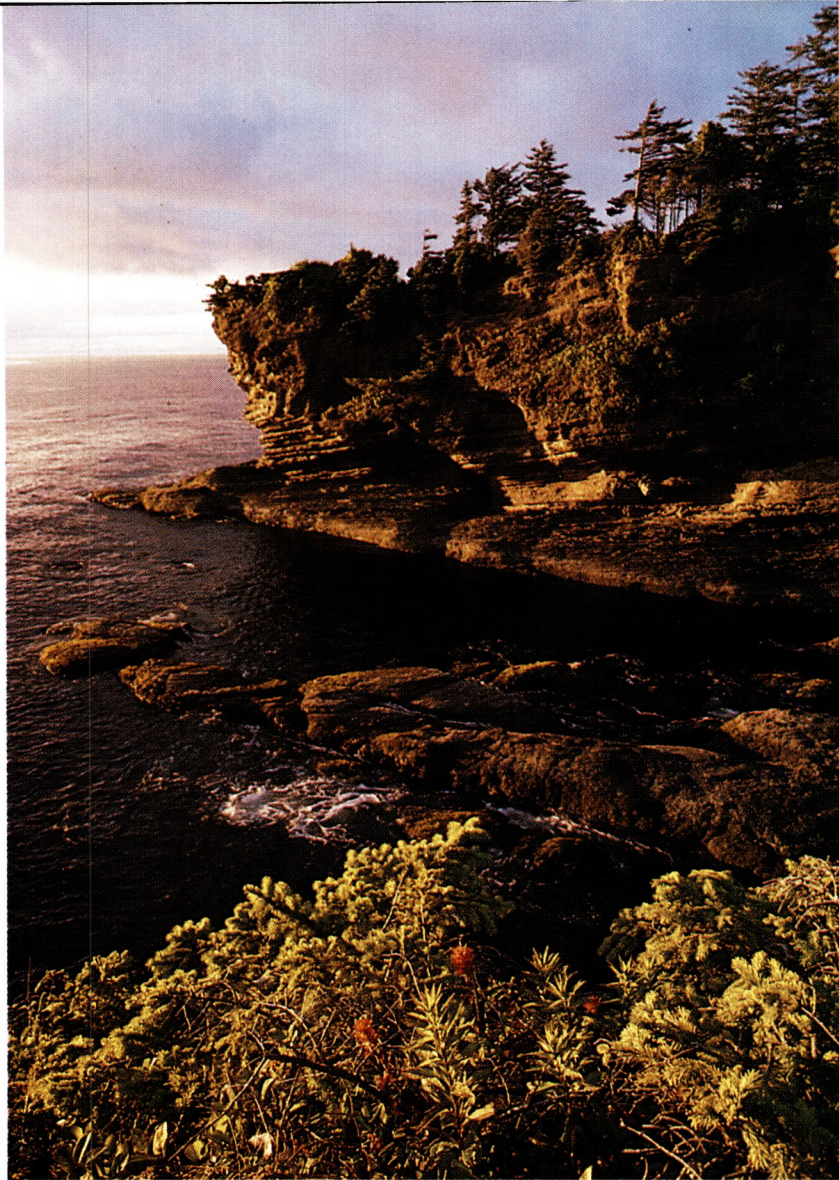
This shallow intertidal surf zone is rich with vibrant colors. Every nook and cranny is gorged with life. Small green and purple sea urchins bore holes into rocks; foot-long mussels and red-lipped goose barnacles cluster together in the froth of nutrients. Carpets of glowing green aggregate anemones get their day-glow colors from symbiotic algae. At deeper depths, dinner plate-sized rock scallops with their shells completely obscured in soft corals

Cape Flattery — the most northwestern point in the continental U.S.

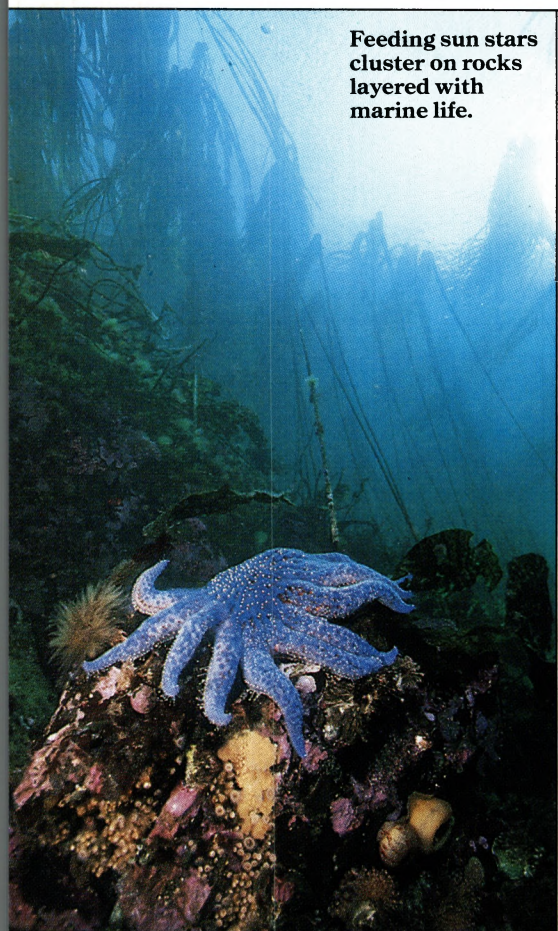
litter the rocks, along with tunicates, sponges and delicate spiral bryozoans.

Cavernous grottos are found all over this region. Perfectly round boulders in the bowels of many of the smaller caves attest to the awesome whirlpool action. The rocky ledges provide the perfect habitat for dozens of rockfish species. On a single dive it is easy to find China, yellowtail, black, tiger, copper, canary, vermilion and blue rockfish. Even the solitary yelloweye rockfish is a common sight at depths past 80 feet.

In the summertime various kelp species are seen sprouting all over the shallow rocky reefs. As the round stalks of kelp push upward they provide another surface of dense foliage for the invertebrates. Brooding anemones mark a very colorful contrast to the bland brown kelp. Stunning shades of red, purple and pink make the anemones appear like shimmering jewels in the undulating ocean flow.



From Neah Bay to Port Townsend, the rugged beauty and awesome diving of Washington's Olympic Peninsula will just blow you away.

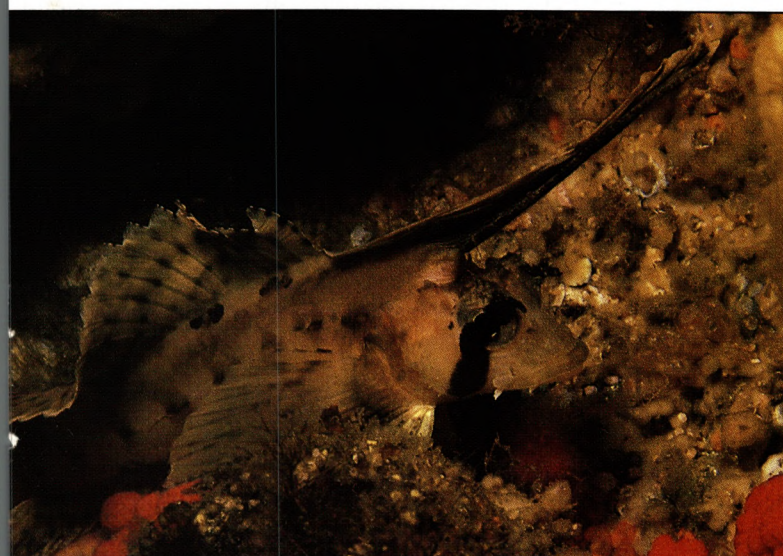


Feeding sun stars cluster on rocks layered with marine life.

vertigo and motion sickness for many who attempt to dive here. Weather conditions can change quickly as well. Thick fog banks frequently roll in and remain for hours and even days. However, in spite of the ruggedness of the area divers seem eager to dive here, so several dive boats are on hand to transport them out to the prime diving grounds during the summer months.

Slightly less exposed than Duncan Rock, the leeward side of Tatoosh and Waadah islands provide excellent dive sites and relative protection from wind and waves. The underwater topography is arguably the most dramatic in the state. Scoured out by glaciers during the last ice age, the rocky cliffs plunge underwater well past safe diving limits. The receding glaciers have also carved rocky shelves reaching to various depths. Most of these ledges and walls are parallel (pointing north). East of Neah Bay these undersea walls disappear into ubiquitous sand and gravel ranging from 40 to 70 feet deep.

Several large campgrounds and inexpensive motels make Neah Bay an ideal late-summer excursion. Makah Indian crafts (baskets, masks and carvings) can be obtained locally. The Makah Cultural Museum has fascinating displays of artifacts recently unearthed from a 500-year-old whaling village.



The rock ledges of Duncan Rock provide habitat for a variety of species like this sailfin sculpin.

Harbor seals, sea lions, giant octopus and wolf eels are also frequently encountered around the rock.

Duncan Rock is a boat dive requiring not only a high level of diving skill but also a cast-iron stomach. The wave action and swirling surge of the open ocean results in

SUPERB SHALLOW WATER DIVING AT SEKIU

About 25 miles east of Neah Bay you come to Sekiu. A fishing village like Neah Bay, Sekiu has several stores, RV parks and cottage motels, and some good near-shore diving. Pinnacle Rock and One-Mile

Beach are good beach dives, and when the weather is calm there are lots of dive sites reaching out in either direction that can be reached by renting sturdy Sekiu fishing boats.

Sand and gravel pervade the ocean substrate at a depth past 60 feet from Sekiu to Port Townsend. However, these shallow dives are marvelous when the surge and waves subside. Underwater rock walls are lined with colorful tealie sea anemones. This fish-eating anemone lives to be the oldest and largest of any West Coast anemone species. Adult tealies are typically 18 inches in diameter and enjoy long life spans. Several public aquariums have specimens still living after 80 years!

Darting between the huge tealie anemones there are also finger-size sculpins (longnose, tidepool, scalehead and sailfin) and the sinister looking wolf eel. Known for its powerful jaws and razor sharp teeth, the wolf eel constantly surprises visitors with its willingness to be coaxed out of hiding by a friendly food offering. *Octopus dofleini*, the world's largest octopus species, can also be encountered along this stretch of the Olympic Peninsula.

SALT CREEK: DEPARTURE POINT FOR PARKS

Moving farther east, Port Angeles as well as Port Townsend are diving locales worth exploring year-round. Salt Creek County Park, in particular, some 11 miles west of Port Angeles, is an idyllic campground that's centrally located for some unforgettable underwater — and topside — activities.

A spectacular shipwreck lies offshore near Salt Creek. A 326-foot freighter, the *Diamond Knot* sank in 130 feet of water after colliding with a bigger ship in the fog on August 13, 1947. Most of the \$4 million cargo of canned salmon was successfully salvaged. The huge man-made reef has become a colorful condominium of encrusted and territorial marine life. Several mated pairs of wolf eels reside near the starboard side of the hull. Giant lingcod lurk in dark corners, and baseball-sized barnacles plus plumose anemones adorn the hull, masts and rigging. Strong offshore currents and limited visibility make this an experience recommended for advanced divers only.

Near the waterfront campsites at Salt Creek County Park are several short steep trails to the water's edge. This area is a marine life sanctuary where you'll find that the black rockfish and lingcod have to

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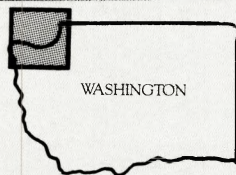
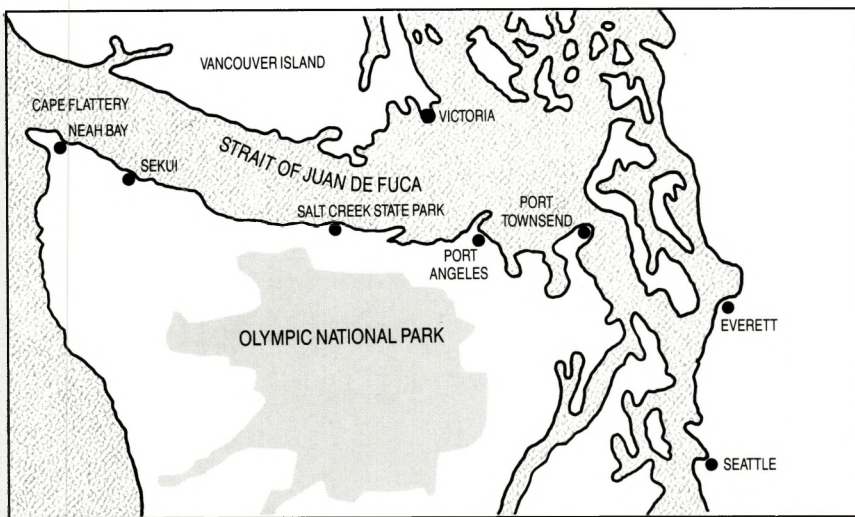
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Olympic Peninsula Dive Facts

HOW TO GET THERE: To reach the Olympic Peninsula (Port Angeles to Neah Bay), travel on I-5 to Hwy. 101 at Tumwater. Stay on 101 until you reach Hwy. 112. Follow 112 to pass through Sekiu and on to Neah Bay.

GENERAL CONDITIONS: Visibility is best at high slack tide in the late summer and fall. Water temperatures vary only slightly, from 42 to 46 degrees year-round. Drysuits or custom-fitting farmer john quarter-inch wetsuits are the preferred exposure garments. Dive only on calm days and preferably on a slack tide. Use the daily current predictions for the Strait of Juan de Fuca Reference Station 815. For custom tidal corrections, shore-current mapping and detailed descriptions of six shore dives along the strait, refer to *Northwest*

be practically pushed out of your way. Shore entries here are difficult and dangerous when there are large ocean swells present, so be aware of surface conditions before embarking on your dive.

For a land-based adventure, only 26 miles south of Salt Creek is the Olympic National Park. With its lush wildflowers, whistling marmots and curious whitetail deer, this 900,000-acre wilderness park holds worldwide bragging rights for its combination of spectacular mountain views, rare temperate rain forests and 45 miles of roadless coastline.

The Olympic Peninsula offers an unbeatable combination of astonishing natural beauty, both underwater and on

Shore Dives, by Steve Fischnaller (Bio-Marine Images, Edmonds, WA 1990). Available in most Northwest dive shops.

DIVE CHARTER SERVICES: *Starfire*, (206) 364-9858 (August & September only); Olympic Dive Center, (206) 452-5264 (groups up to four).

LOCAL DIVE STORES: Far West Resort, P.O. Box 131, Neah Bay, WA 98357, (206) 645-2270 (air fills, possible dive charters); Herb's Motel, Box 175, Sekiu, WA 98357, (206) 963-2346 (air fills only); Olympic Dive Center, 739 West 8th St., Port Angeles, WA 98362, (206) 452-5264 (year-round charters, air fills, instruction); Undersea Scuba Adventure, 6200-A Piedmont Rd., Port Angeles, WA 98362, (206) 928-3044 (full services).

GENERAL INFORMATION: Port Angeles Chamber of Commerce, (206) 452-2363; Olympic National Park, (206) 452-4501, ext. 230.

Olympic Peninsula Celebrations: August — Makah Days at Neah Bay, Salmon Derby Days at Port Angeles; September — 50,000 Salmon Derby, Labor Day Weekend at Port Angeles.

shore. And fortunately, the best time to dive this area is after Labor Day, when the small coastal towns are nearly deserted, the plankton levels drop and the sun streams brilliantly through massive coastal kelp beds. Up until now, the wild undersea wonders of the Olympic Peninsula have remained a relative secret among dedicated Pacific Northwest scuba explorers, but they probably won't remain a secret for long!

Seattle-based F. Stuart Westmorland is a free-lance photographer and writer who specializes in natural history and travel subjects.

Wreck Alley

San Diego's growing collection of derelict vessels benefit divers and sea life alike.

Article and photos by Darren & Stacey Douglass

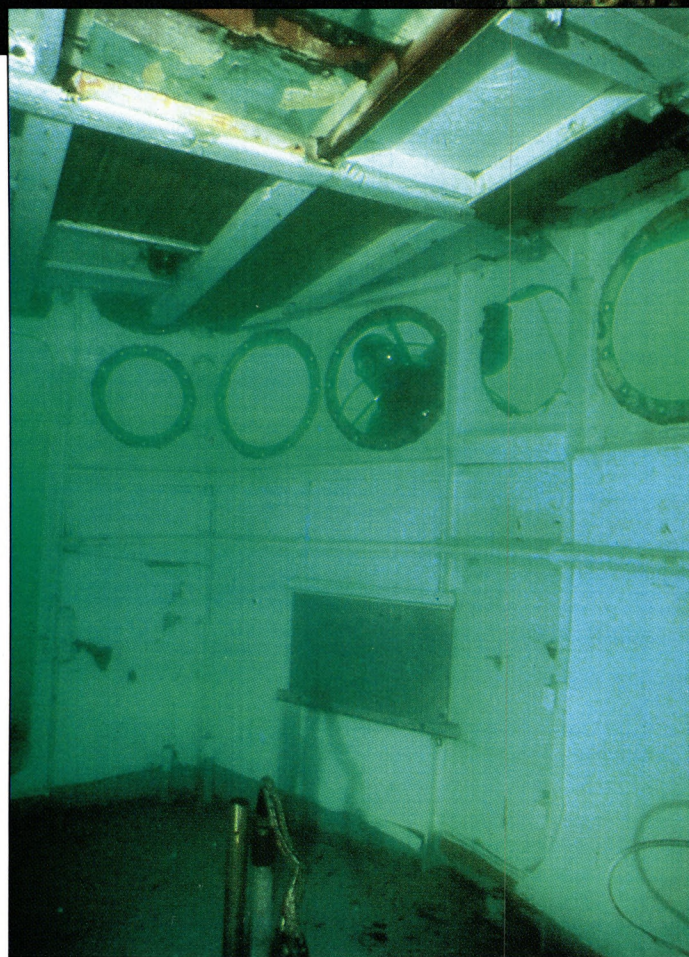
Diver drifts through an upper deck corridor on the El Rey, Wreck Alley's first vessel sunk for recreational divers.

It was a warm San Diego day in July 1989. Seas were calm, skies were clear. Less than two miles out past the Mission Bay breakwater a group of volunteers were hard at work. After nearly six hours of flooding, they had the 156-foot Coast Guard cutter *Ruby E* listing sharply to starboard when it suddenly began to sink stern-first. Those still aboard jumped over the side as the transom

dipped beneath the surface, lifting the bow skyward, and causing the old vessel to resemble an old barnacle-encrusted whale breaching for the last time. The ship's stern slammed into the sand bottom, then the bow, towering 60 feet above the surface, slowly slipped beneath the waves in a geyser of bubbles and foam. Within seconds, only a boiling surface remained.

While the ship settled to the sandy

Bowls still sit on the countertops in the galley of *Shooter's Fantasy*, a 65-foot steel-hulled sportfisher.



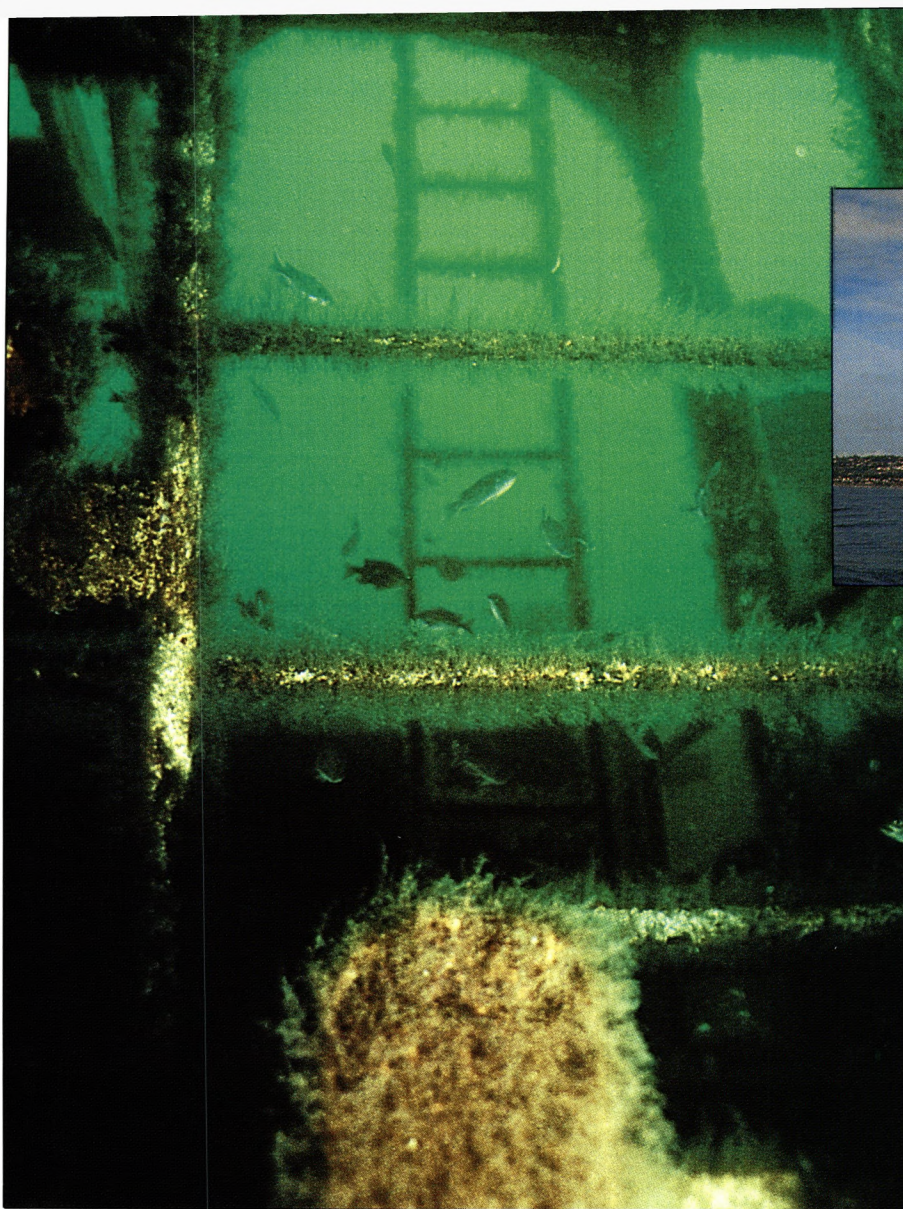
The bridge of the Ruby E is intact and relatively clean of undersea growth.

depths 90 feet below, divers aboard the flotilla of boats standing by suited up for their first dive on San Diego's newest wreck.

When thinking about wreck diving most divers probably flash on the shallow waters of the Caribbean or the deep waters of Truk Lagoon or the cold waters of the Great Lakes. But contrary to what some may think, California is certainly not without its shipwrecks, although most of the older ships found out at the islands are in advanced stages of deterioration, providing divers with only scant visages of their former selves.

However, there's a place off the coast of San Diego where you can have access to a number of wrecks. They're in pretty good shape, they're easy to find, and they're consolidated along the bottom of the ocean in an area known as "Wreck Alley."

Many consider Wreck Alley to be an excellent example of what can happen when divers, private enterprise and public agencies work together to improve the marine environment. Wreck Alley was born during a committee meeting of the San Diego Diving Instructors Association (SDDIA). Several members commented that the one major resource San Diego



Ladder and superstructure of the El Rey.

divers were sorely lacking was shipwrecks. Consequently, the evening's discussion turned to the possibility of sinking not one but several wrecks off the local coastline, creating artificial reefs for the local ecosystem as well as providing some shipwrecks for divers to enjoy.

EL REY PAVES THE WAY

As it turned out, at the same time SDDIA members were scratching their heads and wondering how to find a couple of ships that they could sink, Fish & Game was investigating the possibility of implementing an artificial reef program on the otherwise barren sandy bottom off Mission Beach. What's more, a local kelp harvesting company named Kelco had recently decommissioned an old kelp harvesting vessel named *El Rey* and was wondering what to do with it. The pieces of the puzzle fell together.

In less than a year *El Rey* was cleaned to meet environmental standards. Much of her machinery was removed and large

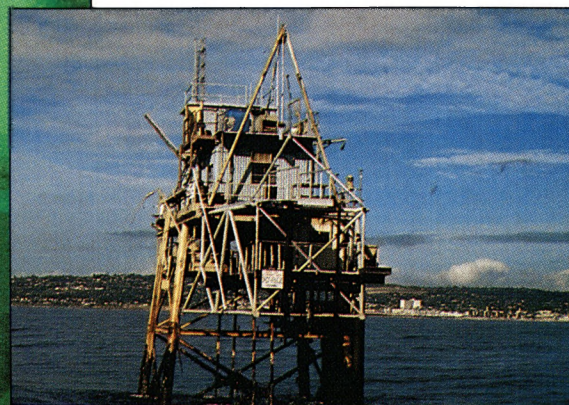
holes were cut into the decks, allowing divers safe and easy access to the ship's interior. Then the vessel was donated to Fish & Game who towed it to its permanent resting place. A U.S. Navy underwater demolition team blew a series of holes into the ship's hull and the vessel settled to the bottom in 90 feet of water.

El Rey is Spanish for "the king," and as a shipwreck it certainly lives up to its name. This 100-foot-plus wreck is still intact (at least by California standards). Fish congregate around the site and invertebrate life has overtaken ship surfaces; there's even a small population of metridium anemones growing along the rusting hull.

Little is left of the original wheelhouse and crew's quarters. Most of the wooden superstructure was blown apart during the sinking, and what was left was destroyed by storms. Iron beams and railing do remain, however, along with ladders and stairways, offering plenty to explore.

A buoy marks the wreck site. You can tie

The NOSC tower before 20-foot storm surf in January 1988 sent the structure to the bottom.



Diving Wreck Alley

Since many of the larger charter boats don't find it profitable to run all the way from San Diego Harbor to Mission Beach, a flotilla of six-pak dive boats has arisen out of Mission Bay. These boats specialize in half-day and full-day trips to Wreck Alley. Arrangements can be made through any local San Diego Dive store, or by calling the operators directly.



Ruby E in July 1989, as she was readied to join the other vessels in Wreck Alley.

Page 3 — 35 feet long, Capt. Joe Farley, (619) 941-1240

Louis Ann — 36 feet long, Capt. Larry Cochrane, (619) 452-9985

Hydro Diver — 36 feet long, Capt. Jay Greenbaum, (619) 273-1226

America II — 35 feet long, Capt. Rich Cassen, (619) 584-0742. This vessel is licensed to carry six to 16 passengers.

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off on the buoy or anchor nearby and then swim down the buoy line to the bottom.

SHOOTER'S FANTASY RISES AGAIN

The *El Rey* was later joined by the 65-foot steel-hulled sportfisher *Shooter's Fantasy*. This boat had sunk in San Diego Bay several years earlier. When the artificial reef program was initiated she was refloated with liftbags and towed over to Wreck Alley. Once in position, the liftbags were deflated and the vessel returned to the bottom. *Shooter's Fantasy* was originally placed near the *El Rey* but the huge swells that pounded the San Diego coastline in January of 1988 moved the wreck over some 200 yards. At present, the vessel is unbuoyed.

Shooter's Fantasy is an interesting dive since it remains relatively intact. The wheelhouse and cabin have been removed but below decks offers advanced divers many penetration opportunities. Although small inside, there are several compartments you can walk through. The wreck sits on the sand in less than 60 feet of water.

WE DON'T NEED NO STINKING BARGES

A barge has also been sunk in Wreck Alley, but it is anticlimactic compared to

the other wrecks in the area. It is rumored, however, that during lobster season this low-slung platform definitely warrants checking out.

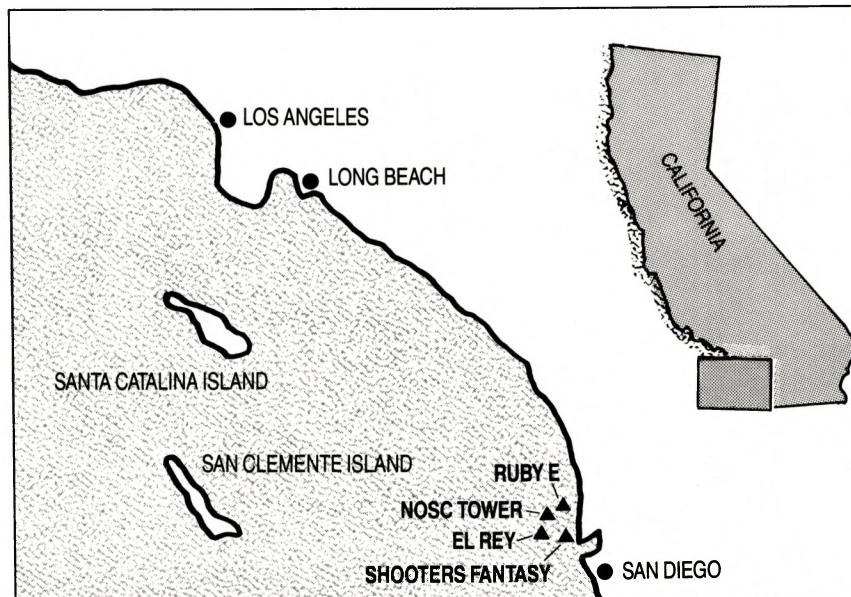
THE TOWER TAKES A DIVE

The Naval Ocean Systems Command tower was erected off Mission Bay in 1959 and used for oceanographic studies. The structure resembled a small oil rig but instead of drilling equipment it housed a field research laboratory. Like oceanic oil platforms, invertebrate life thrived on its pilings, attracting divers as well as myriad baitfish, halibut, bass and occasional pelagics.

But 20-foot surf during the storms of January 1988 battered the tower, twisting its massive base struts and finally snapping them in half, causing the seagoing skyscraper to collapse. The wreckage now sits in from 30 to 60 feet of water.

RUBY E: NEW KID ON THE BLOCK

The 156-foot *Ruby E* takes current honors as Wreck Alley's largest resource. A former Coast Guard cutter built during Prohibition to pursue rum runners, it had a top speed of nearly 30 knots. Unfortunately, the vessel was not placed into service until Prohibition ended. She was decommissioned in 1965, sold, refitted and



Wreck Alley Diving Etiquette

If you visit Wreck Alley on your own boat, a few tips will help ensure a safe and successful day.

1. Tie off to the buoys that mark most of the wreck locations. If another vessel is tied off, raft vessels together. This helps keep anchors from dragging over the wrecks — and onto the heads of divers. If you must anchor near a non-buoyed wreck, be cautious of divers in the water.

2. Artifacts on Wreck Alley vessels may

not be removed due to the area's artificial reef status.

3. Boaters should be aware that many divers are in the water at Wreck Alley (especially on weekends), and divers should remember that boats are plentiful topside, so be careful.

4. When making a full day of repetitive diving, be especially mindful of depth and bottom time on the deeper wrecks such as the *El Rey* and *Ruby E*.

went to work as a commercial fishing vessel. After being repossessed, she was partially scrapped and then donated to the Wreck Alley project.

Before she went to the bottom the *Ruby E* was cleaned extensively with the help of local dive clubs, who filled dumpsters with debris. Additionally, several large holes were cut into her decks and sides to allow divers easy access throughout the vessel. From her upper deck mast to the ammunition compartment two decks below, the *Ruby E* is an extensive and penetrable wreck. (A stainless steel plaque has been affixed to the base of the *Ruby E*'s bridge acknowledging the individuals and groups that participated in the fund-raising efforts to prepare her for scuttling.)

Wreck Alley program coordinator Al Bruton has stated that more wrecks are scheduled to follow the *Ruby E* to the bottom (Wreck Alley's artificial reef program has an open permit which allows for the sinking of future vessels). Once new ships are located and donated to the State of California, they will be environmentally cleaned, made diver safe and then sent to join the *El Rey* and the *Ruby E*.

There is a fleet of six-pak dive boats that takes divers out to Wreck Alley for half and full day dives. Interest is increasing; divers are coming from all over California and even Arizona to visit these wrecks. In the eyes of its participants, the Wreck Alley project appears to be a "sinking" success.

Currently, Coastal Commission approval has been granted to begin a similar program off the Los Angeles coast. David Lee, project coordinator for the Greater Los Angeles Council of Divers' "Wreck Alley L.A." program, is in the process of raising funds to send the former cruise liner *Princess Louise* to the bottom off the Palos Verdes coast, the first of many wrecks projected to be sunk in this area.

But for now, San Diego's Wreck Alley reigns supreme as a haven for wreck diving aficionados. If you haven't visited San Diego's Wreck Alley, do so soon. There's already a lot of wreck diving adventure to enjoy just a short boat ride off Mission Beach, with promises of much more to come in the future.

Donations for "Wreck Alley L.A." can be made to the Greater Los Angeles Council of Divers, P.O. Box 1533, Beverly Hills, CA 90213. ☐

Darren and Stacey Douglass are PACIFIC DIVER's feature editors. Darren is author of the newly released Guide to Shipwreck Diving: Southern California by Pisces Books.

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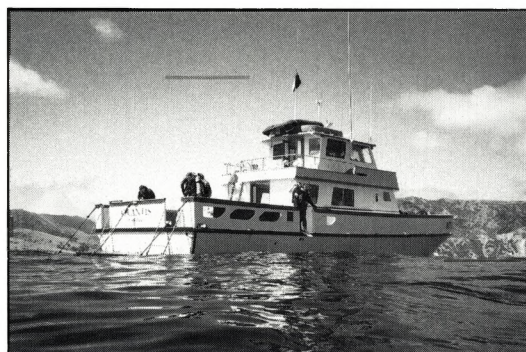
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The Magnificent 7

*You can't dive them all, so here are PD's top
picks for the best Palau has to offer.*





*A school of moorish idols darts over a coral reef in Palau's cobalt blue waters.
Photo by Bruce Rasner.*

From the window of the Air Micronesia 727 the islands of Palau sparkled in the sun like hundreds of emeralds set in a sea of turquoise.

After an 18-hour flight from the U.S. mainland, the aquamarine shallows and cobalt blue drop-offs beckoned to us like a pool of cool water to a group of thirsty desert wanderers.

A two-hour flight from Guam, Palau is a coral-fringed lagoon 120 miles long and 25 miles wide. Four large islands comprise the archipelago, with Koror, Palau's capital, located on the largest. Its position in the western Pacific made Palau an important base of operations to early Spanish and English traders in the 1800s, and then to the Germans prior to World War One. After the Great War ended in 1918, the islands were mandated to the Japanese, who turned them into a naval stronghold in preparation for World War Two. When Japan surrendered in 1945, the islands became a U.S. Trust Territory. Just recently, Palau became an independent republic.

(Continued)



Blue Corner is a steep wall plummeting to abyssal depths. It's one of Palau's most popular dive sites.

Palau is perhaps best known for the intrinsic beauty of its 300 tiny limestone islands, only eight of which are inhabited. These small mushroom-shaped islets are thick with jungle vegetation and create a maze of calm cays, mirrored pools and tight passages that are ravaged by swift currents which have carved interesting indentations into the rocks.

For an island country that has been so heavily influenced by outsiders, Palau has been able to maintain a strong hold on its wood carving, dance and musical heritages. But Palau's greatest resource is its people. They are friendly and hospitable, a reflection of a people who reside on an island paradise.

When we landed at the airport our dive group climbed into a bus for a ride along hilltop vistas to the luxurious Palau Pacific Hotel, one of the chain of Japanese-owned Pan Pacific Hotels. The bus pulled up in front a beautiful lobby, a huge thatched hut with varnished bamboo, mahogany and teak throughout. Wicker chairs faced the white sand beach and swimming pool. An open-air veranda where meals were served overlooked the water, a place we later discovered was also perfect for enjoying magnificent sunsets.

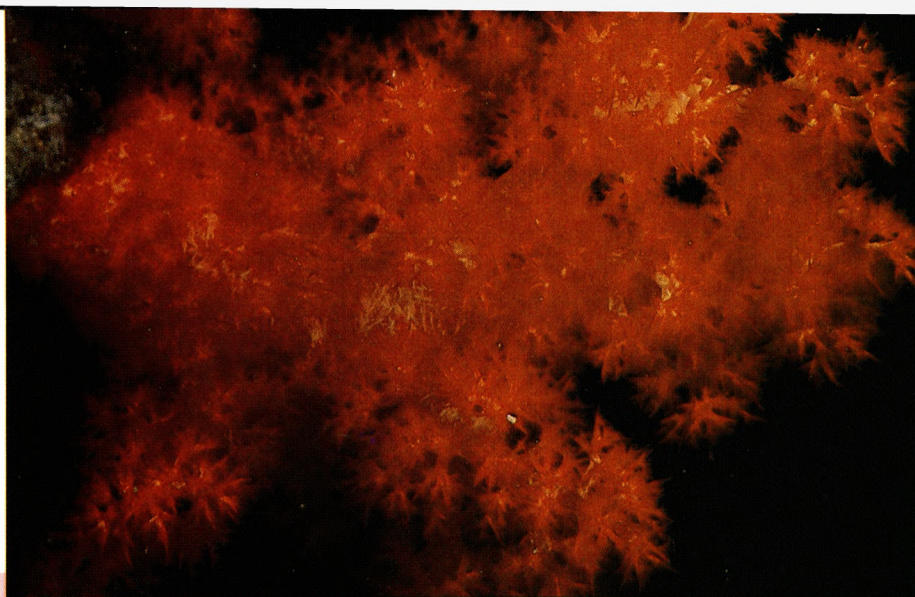
In front of the hotel there was a dock for dive boats, and a dive shop and freshwater basin for rinsing gear. Each room overlooked a carefully tended garden. The air conditioners were powerful, floors were tiled and there was plenty of workspace to assemble our camera equipment.

The dive boats used at the Palau Pacific Hotel were 20- to 24-foot fiberglass Yamaha speedboats powered by 250 horsepower Johnson outboards which usually held from four to six divers. Most of the dive sites were located from 45 to 90 minutes from the hotel docks, so the Palauans ran their boats "flat out," racing among the rock islands en route to the dive destinations, negotiating islet gauntlets with the precision of slalom ski racers. (The erosion of several of these rock islands has created archways which some boat operators like to scream through at speeds pushing 35 miles per hour. But don't worry; you'll make your dive site. Just stow your camera equipment safely below, grab a railing and hold on!)

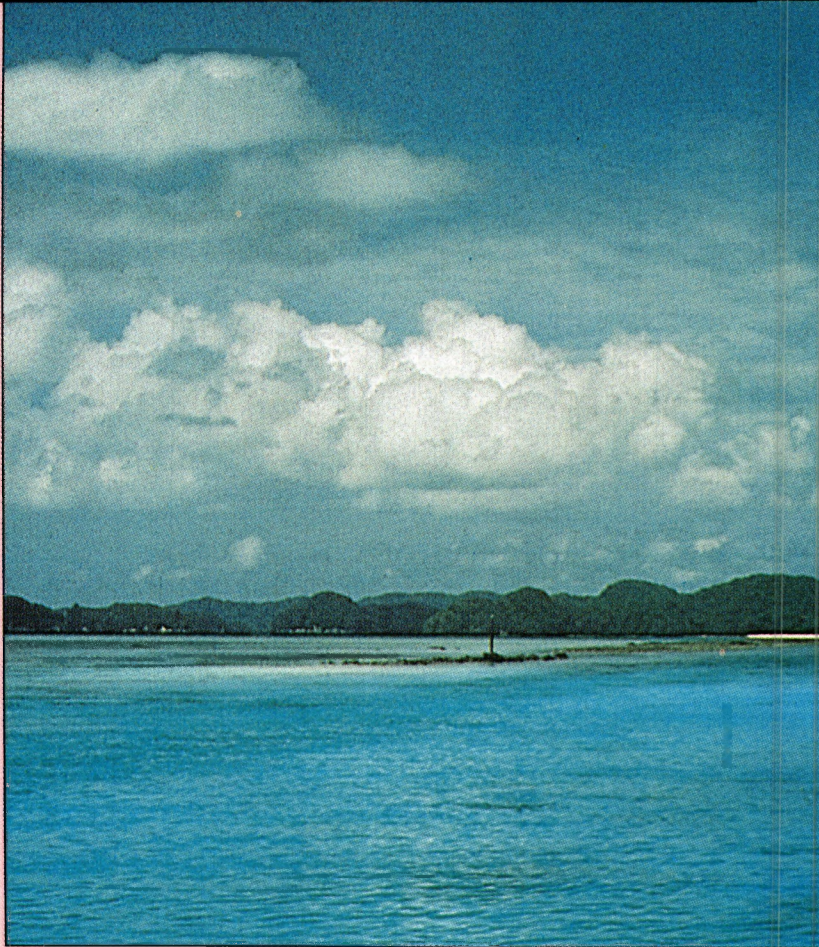
Within an hour of checking into the hotel we were at the dock, suited up and waiting for the boats that would spend the next week taking us to some of the best diving Palau had to offer. Following are some of the outstanding dive sites we had the opportunity to visit.

#1 DROP-OFF

This "mini-wall" was a quick run from the Palau Pacific Hotel in calm, sheltered



*Above:
Intricate
marine life
grows among
Palauan
wrecks.*



Navigating over the shallows to the best dive sites is tricky business, but Palauan dive guides seem able to do it with their eyes closed.

water. It turned out to be a great spot to get acclimated to Palau after the long airplane ride. Waters were crystal clear and undated with reef fish.

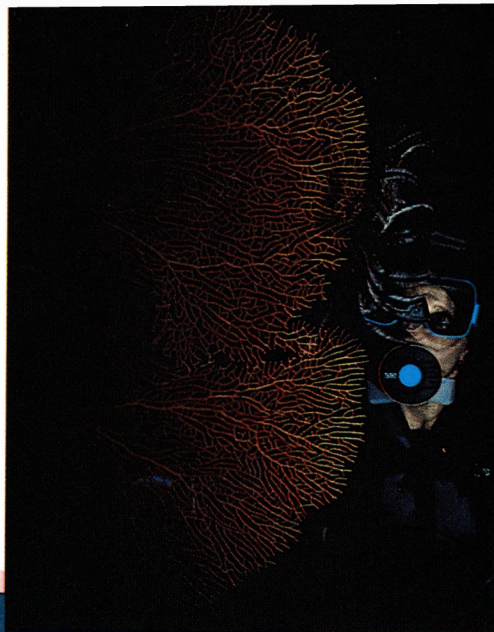
Dropping in on the #1 Drop-Off was comparable to being suspended in an aquarium. Silvery opal sweepers danced along the walls. Interesting varieties of starfish and nudibranchs sat in the sun-

dappled shallows, and on the bottom at 100-plus feet, sand and crushed corals formed a path of debris that plummeted even deeper. #1 Drop-Off wasn't the most extensive wall dive we encountered on Palau, but it was certainly beautiful. Fish were everywhere, visibility was excellent and it was easy to make it back to the hotel for lunch.

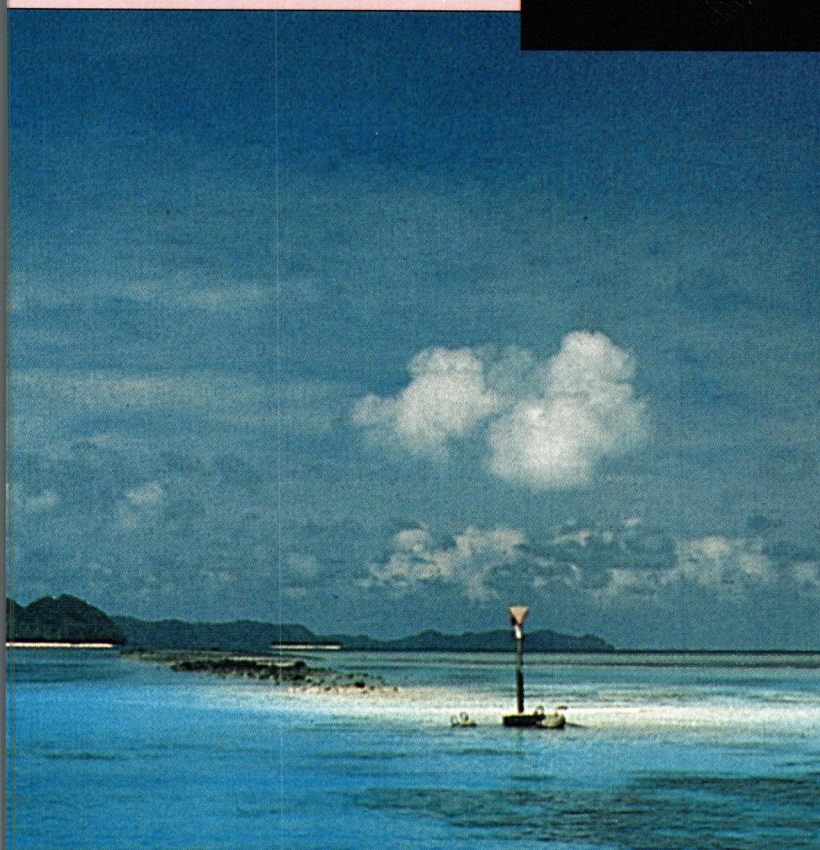
BLUE CORNER

Undoubtedly one of Palau's most popular and fascinating diving sites, Blue Corner was a long, high-speed boat ride from the Palau Pacific Hotel and necessitated passing through "German Channel," a waterway blasted through the coral by the Germans back when they held the islands.

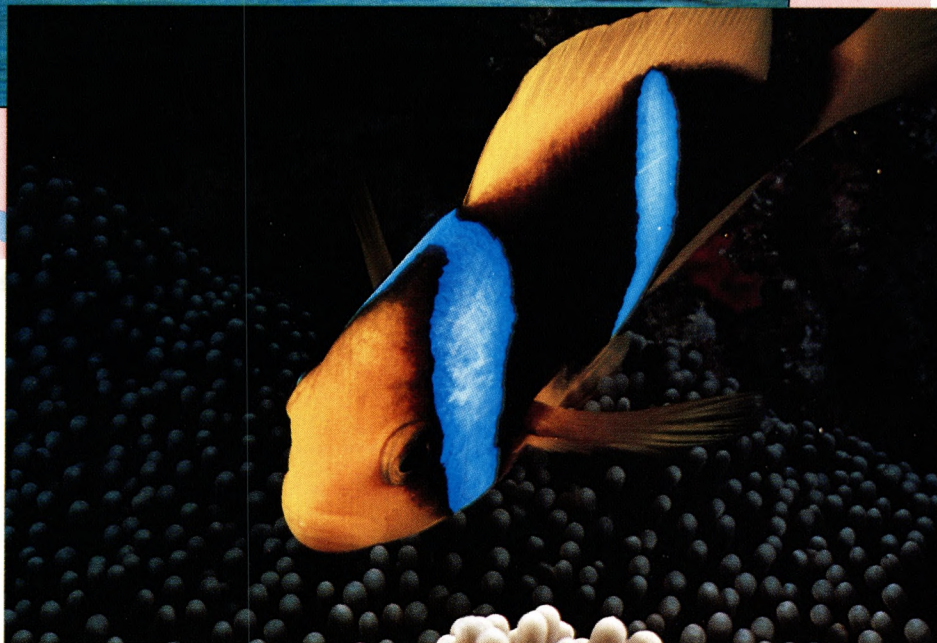
Blue Corner was a steep wall that plummeted from the shallows to abyssal depths. Vibrant corals grew along the ledges, schools of barracuda swam in the distance along with resident gray reef and black-tip sharks. Large barracuda and jack swept in and out of view a short distance beyond the wall. Other oceanic residents such as



*Above:
Branching
gorgonians are
found in deep
water along
the walls at
Blue Holes.*



*Below:
Colorful
anemone fish
are common in
Coral
Garden's
shallow water.*



jellyfish occasionally passed through the area as well.

THE BLUE HOLES

Just getting to the Blue Holes was an adventure in itself. Imagine racing a speedboat through coralline shallows while headed for a narrow strait between two islets. Sitting on the bow, we could count the sharks blasting away in high-speed retreat as the boat skimmed over the reefs. The boat then slowed down to transit the narrow waterway between the islands while the captain carefully picked his way through waters not much more than three feet deep.

Stopping the engines over the shallows, a short distance from the boat we spotted a deep blue chasm — the Blue Hole, the top of which was only in about four feet of water. Cameras in hand, we went over the side and descended through the vertical cavern. It was like dropping 100 feet down a chimney that opens up onto a fireplace where reef sharks and schooling butterflyfish congregate along the ledges. Once out on the wall we were able to ascend slowly to shallower depths where we found a variety of corals, anemone fish and slender coronets.

EMILY'S WALL

This dive site was located somewhat closer to the hotel than Blue Holes and Blue Corner and offered great diving right off the beach of a deserted island. Apparently, dive boats will often come here for lunch and make Emily's the second dive of the day without even moving the boat. A short snorkel off the beach yielded a spectacular drop-off that enabled us to easily pick and choose our depths. The current was not strong here, which made it easy to return to shore at the end of our dive.

Just a few feet beneath the surface at Emily's Wall we found huge sponges, lionfish, vibrant soft corals, red and orange gorgonians and branching black corals as well as a few sharks. The shallow reef top near the surface absorbs tremendous heat on sunny days, with shallow waters approaching 90 degrees during the outgoing tide. It was like surfacing in a Jacuzzi.

BARNUM'S WALL

Emily's Wall has a tendency to get blown out during periods of swell or storm, so a protected location like Barnum's Wall offered a more predictable dive site. Like Emily's, Barnum's Wall was a deep dive with only a mild current running through the site. Visibility was excellent, like on most wall dives we encountered at Palau; 100-foot-plus days were not at all uncommon. Here we found barracuda, rays, sergeant majors and brilliant sea goldies.

(Continued)

WONDER WALL

This site was located in a narrow strait between two rock islands. Apparently, when the tide is slack, it's just one of your average Palauan wall dives with less than spectacular visibility. When this dive is outstanding is during the outgoing tide.

As the tide went out the current literally screamed through the narrows. We hopped off the boat and into the water and we were gone. Forget your cameras on this dive!

As it turned out, if you wanted to avoid the full power of the current, you had only to drop down to 100 feet where the tidal flow was not so severe. But the current was great fun, and unfortunately the ride was short — only about 10 minutes. On the leeward side of the rock island we were able to grab our cameras from the boat and record the beauty of the corals and colorful reef fish.

CORAL GARDEN

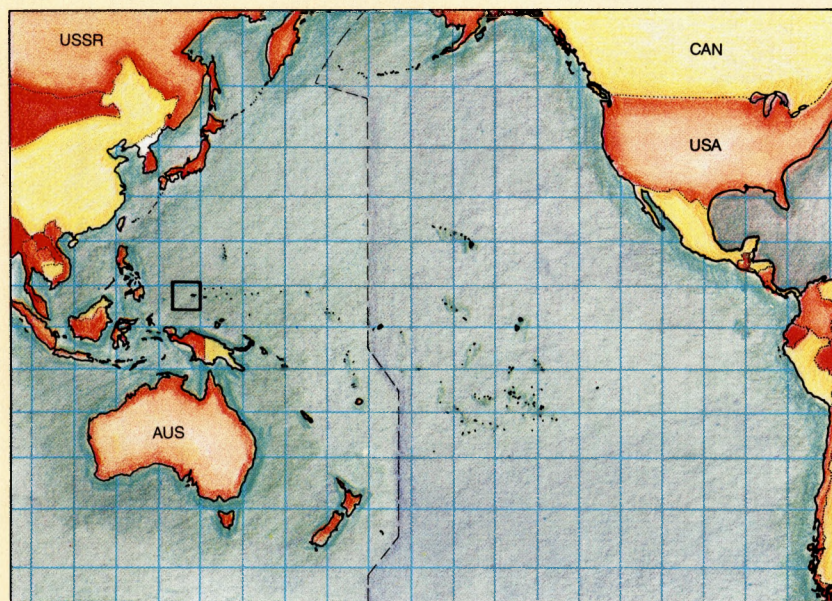
Coral Garden was located northwest of the windward rock islands and featured calm waters when other areas were blown out during storms. This was a beautiful shallow dive; one of Palau's few "wall-less" areas.

Coral Garden was a sloping terrace of delicate plate corals, hard branching corals, damsels, sergeant majors and butterflyfish. Here we encountered giant tridacna clams four to six feet across weighing 1,000 pounds. Clams like these were made famous in the bygone days of B movies where bumbling hard-hat divers perished in their grasp. Fortunately, these clams were no more dangerous than the moray eels, sea snakes and black-tip reef sharks we enjoyed photographing.

WRECKS

In 1944, prior to Operation Hailstorm which sunk the Japanese fleet at Truk Lagoon, Japanese observers spotted an American reconnaissance plane scouting the Imperial Fleet stronghold. Knowing attack was imminent, many Japanese naval vessels retreated to Palau, leaving the protection of Truk's hundreds of aircraft and shore-based operations for an island whose only protection was some artillery perched atop its jungle mountains. American dive bombers decimated the fleet at Truk and then they moved on to Palau and finished off these stragglers.

Since their islands are noted primarily for outstanding reefs and walls, dive guides are often surprised when asked by visitors to dive the Palau wrecks. But they will take divers to these wrecks if asked. However, most of the wrecks are in small, backwater jungle lagoons and heavily covered with silt, so visibility rarely exceeds 30 feet. But



Palau Dive Facts

Located: Two hours southwest of Guam.

Getting There: Currently Air Micronesia (a subsidiary of Continental Airlines) is the only airline providing service to Micronesia. Either because or in spite of this, delays, interruptions and flight cancellations are standard fare. Unfortunately, if you don't like the service there is little you can do about it. Try to maintain a good attitude and go with the flow.

Entry Requirements: Proof of U.S. citizenship (birth certificate or passport).

Health Requirements: Vaccinations are not required to enter Micronesia, but consult your personal physician about inoculations that are helpful in avoiding problems when traveling abroad.

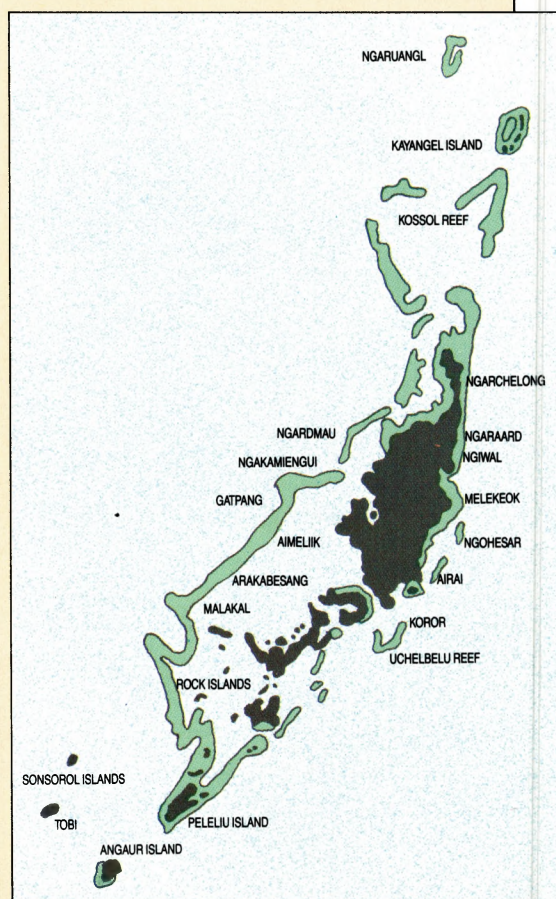
Climate: Ranges between 72 and 86 degrees, year-round. Evenings can be cool when the breeze is up and when rain is expected. Many consider Palau's weather to be best from January to July.

Language: The two major languages spoken in Palau are Japanese and English.

Electrical Current: 120-volt power is standard throughout the island.

Tipping: 10 to 15 percent is an accepted practice for hotel personnel and dive operators.

Clothing: Beware of the air conditioners! Even if it is sultry and warm outside, the interior of restaurants can be incredibly cool. Lightweight layering provides the most comfort, and light-



weight jackets may be beneficial. Also, remember that in Palau modesty is the best policy when choosing your attire, especially if you plan to visit a rural village.

Currency: U.S. dollars are legally tendered in Palau. But don't go into a wood carver's shop and hand the man a \$50 bill. A fistful of singles always comes in handy.

some avid wreck divers don't seem to mind.

Palau wrecks include large cargo ships, a light cruiser, small coastal gunboats and even Japanese Zeros. The wrecks are relatively intact; most still have the majority of their shipboard equipment on board.

There's more to diving Palau than vertical walls, drop-offs, drift dives and wrecks. For example, there's the mysterious Jellyfish Lake, one of several small lagoons heaved upward by tectonic plate action eons ago. This lake is home to thousands of saltwater jellyfish. After a semi-arduous hike through the interior of one of the largest rock islands, you can swim with these medusas without fear of getting stung (the jellyfish have no stinging tentacles). There are also caves with undersea stalactites for experienced cave divers.

Because of the distances required to reach the dive sites, most of the time you can get in only two tank dives a day along with some snorkeling. Lunch is provided on these extended jaunts, served by the dive guides on deserted islands. It is not uncommon for Palauan dive guides to bring their American, Australian and Japanese guests to the same deserted beaches for lunch.

And here is where we encountered a problem; admittedly, not anything worth notifying the United Nations about, but a problem nonetheless. While the meals we enjoyed at the hotel were excellent, apparently the Palauans who have visited the United States had the opportunity to visit some of our fast food emporiums and consequently came to the conclusion that we Americans will eat anything. Therefore, when lunchtime rolled around out on our midday beach picnics, while our Japanese counterparts were dining on Oriental delicacies out of neatly packaged lunch boxes, we were handed bologna, fried egg and mayonnaise sandwiches. In my efforts to negotiate half a sandwich for some sashimi, a Japanese man smiled and politely declined. Indeed, even when I placed an entire Palauan-Yankee sandwich on the bargaining table for two measly rice balls, my offer was politely, but firmly, refused. Thus the trade war continues.

Lunches aside, Palau was easily one of the finest diving areas we've had the opportunity to visit, from its people, accommodations, diving operations and diving sites to its cosmopolitan assortment of visitors. As far as the sandwiches go, well, next time we'll see what the Australians have in their lunch bags. □

Darren and Stacey Douglass are PACIFIC DIVER's feature editors.

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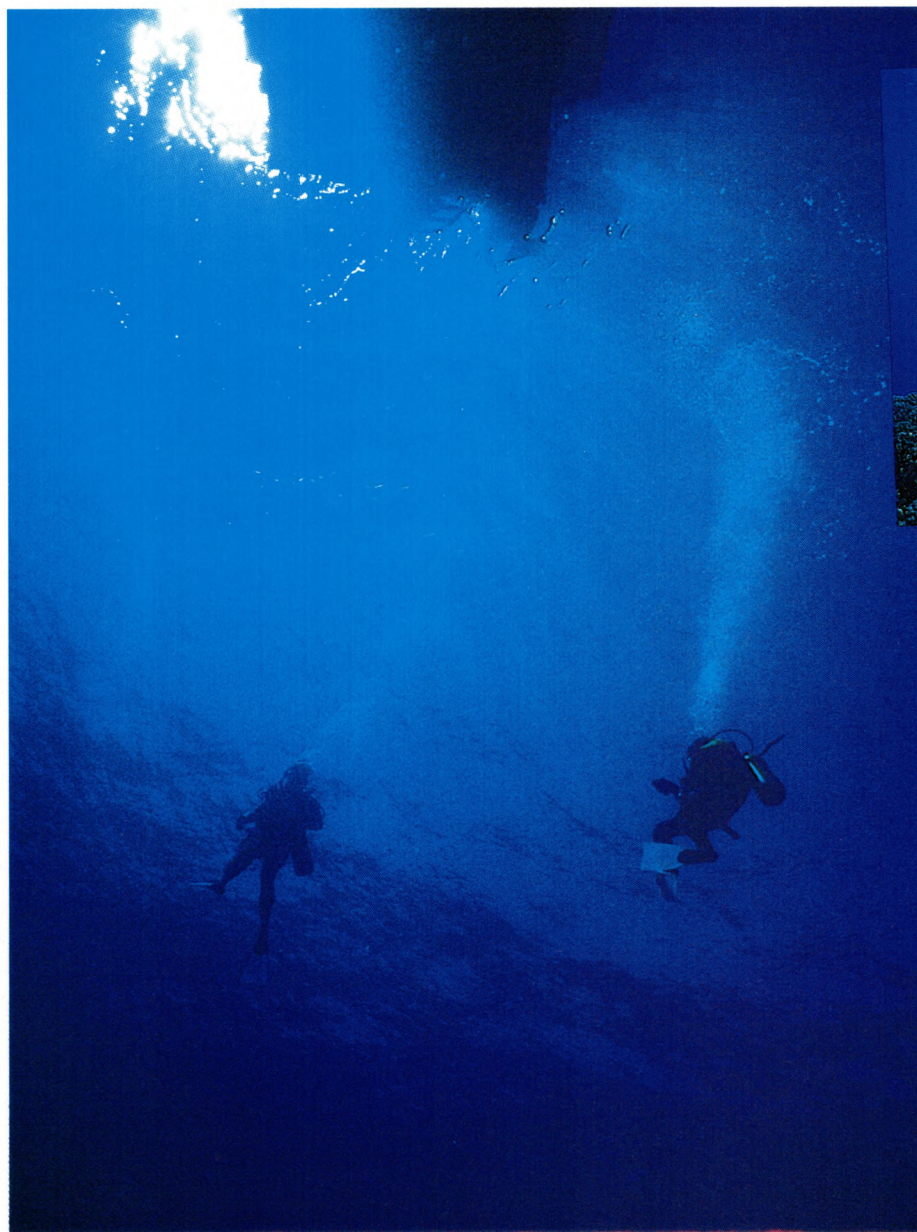
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Even in the wintertime you'll find 100-foot visibility and water temperatures hovering in the mid 70s.

Article by John Brumm

Photos by Steve Essig

A Guaranteed Good Time

Hawaii's King Kamehameha Divers explores the idyllic Kona Coast.

Diving is easy on Hawaii's Kona Coast. There's warm water and outstanding visibility. Whales and dolphins and monster swordfish pass regularly over a volcanic ocean bottom covered with enough lava tubes and caverns to bring tears to an underwater geologist's eyes.

Located on the youngest island in the Hawaiian chain, the Kona Coast doesn't have a lot of sand on its shores and no agricultural industry, so rainstorm runoff is at a minimum, creating the clearest water in the islands. Actually, rainstorms are at a minimum too, since the Kona Coast is protected from the wind and wet weather of the windward side of the Big Island by the Mauna Loa volcano.

These *primo* conditions persist all year long. In midsummer (around July and August) water temperatures hover in the low 80s, air temperatures in the mid 80s and visibility pushes 200 feet. In the wintertime, water temperatures drop to a "chilly" 76 degrees, while air temperatures stabilize at around 80 degrees and visibility stands at just under 100 feet. Last year Kona Coast dive operators lost an average of only five days due to inclement weather and water conditions. In short, a fair weather dive trip to the Kona Coast is about as sure a bet as you can get without diving in an indoor swimming pool.

One of the Kona Coast's most popular dive operators is King Kamehameha

Richard Smith feeds the locals. Although there is a variety of fish life on hand to enjoy, the real draws of the Kona Coast are the lava tubes and caverns and the pelagics.



Divers, located in the Hotel King Kamehameha at the base of the pier in the town of Kailua-Kona. Owners Richard and Liz Smith, originally from Concord, California, used to be frequent visitors to the Kona Coast themselves. Richard's job had him flying to the Big Island every six weeks on business, so he found himself making 200 recreational dives a year along the Kona Coast and wondering why he was even bothering making that plane trip

New divers are separated from more experienced divers so both groups can be sure to have a good time in the water.

back to the mainland every other month.

So when retail footage became available in the Hotel King Kamehameha, the Smiths didn't hesitate for a moment. They leased the space, moved to Kailua-Kona and opened up King Kamehameha Divers.

King Kamehameha Divers has the distinction of being the only PADI IDC (Instructional Development Course) facility on the Big Island. With its IDC rating and a full complement of IDC staff instructors, King Kamehameha Divers now has the capability to train open water divers to be a fully certified instructors for those looking to make their livings in the Hawaiian dive industry.

In addition to the dive shop and IDC facility, Richard owns and operates the 38-foot dive boat *Diversions*. The custom-designed Delta dive boat is certified for 22 but Smith limits his manifest to just 18 divers, which he then divides into groups of no more than four divers per dive guide. He makes it a point of separating new divers from more experienced divers so both groups can be sure to have a good time in the water.

Daily dive rates aboard *Diversions* are \$65 if you bring your own gear, or \$75 if you need to rent gear. This will get you two dives at two different locations, and includes tanks and weights, a continental breakfast, a light lunch and drinks while on the boat.

A normal diving day starts at 8 a.m. when everybody meets at the shop. The boat crew takes your gear and loads it onto the boat while you enjoy a continental breakfast. The boat leaves the dock at 8:30, heading out for prime uncrowded dive sites. The Kona Coast stretches for over 100 miles, so local dive operators stay

out of each other's way. If there's another boat anchored at one dive site, Richard will move on to another spot, and other operators will show the same courtesy to him. Everybody is given lots of room simply because there's lots of room to be had. There are more than 120 known dive spots to choose from; you could vacation on the Kona Coast for years on end and never have to dive the same spots twice.

Diversions is usually back at the dock by about 2:30, although since the boat only makes one run a day there's really no hurry. Richard normally just lets nature call the shots. If, for example, on the way back to the harbor a school of dolphins crosses *Diversions'* bow, Richard will stop the boat so his group can get in the water and take some photographs.

One unique service offered by King Kamehameha Divers is the way in which the crew handles your dive gear. Once you get to the shop in the morning you no longer have to struggle with your gear. The crew takes your dive bag and tanks and weights down to the boat, and after the dive day is over, the crew unloads your gear and brings it back up to the shop and then — get this — they wash it for you. If you're only signed on to dive for the day, they will then bag your gear and have it ready for you to pick up. However, if you're



King Kamehameha's 38-foot dive boat Diversions runs with a maximum of only 18 divers.

scheduled to dive with King Kamehameha Divers again, they'll take your gear back to a drying/storage room and hang it up until you return for your next dive. Think about it: no hauling soggy gear back to you hotel, no rinsing the salt out in the bathtub and cluttering your balcony with dripping wetsuits and BCs. All you have to do is show up and your clean, dry gear will be waiting for you.

King Kamehameha Divers offers a variety of dive packages and special courses for vacationing divers. For example, there's a three-day dive package available for \$165 (or \$180 if you need to rent gear). Or, for an additional \$125 on your three-day rate you can leave with a PADI advanced diver rating.

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Kona Coast. For \$55 you get to enjoy two dives, snacks and all the hot coffee you can drink. However, while Monday and Friday are the *scheduled* night dive evenings, Richard will take the boat out any night of the week if three or more divers request it.

If you travel to Kona with non-diving friends or family who decide they'd like to give diving a try, King Kamehameha Divers offers daily introductory scuba sessions at the hotel pool at 12:30, 2:30 and 4:30 p.m. They run about 90 minutes, and are offered at no charge.

In addition to the introductory courses, King Kamehameha Divers offers refresher courses — also at no charge — for divers whose underwater skills have gotten a little rusty. Like the introductory sessions, they are held in the hotel pool and give divers an opportunity to get used to their equipment before heading out on the boat the next day. Both introductory and refresher programs conform to PADI standards.

Some divers visiting the Big Island get to the Kona Coast by their own means and then contact King Kamehameha Divers to schedule their dive trips. Others who like to have all the travel and dive arrangements taken care of before they leave home contact King Kamehameha Divers at the outset.

Liz Smith handles all travel arrangements for King Kamehameha Divers, from air fare to car rentals to hotel accommodations to diving. Because she handles lots of dive travel packages, Liz finds she can get cheaper rates for her clients by handling the arrangements on the destination end. For example, booking a room at the Hotel King Kamehameha through a mainland

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travel agent will cost approximately \$95 per night; Liz can get you that same room for \$79, and throw in a rental car at no extra charge.

If your vacation budget doesn't allow for \$80 a night accommodations, Liz can get rooms right across the street from the dive shop for \$50 to \$55, or three-bedroom condos for divers traveling in groups. Just tell Liz what you're looking for and how much you can spend, and she will send you all the appropriate information and

brochures. Review the material, decide what you want, then give Liz a call again and she'll take care of everything.

After two years of providing dive vacation packages and guiding divers from one end of the Kona Coast to the other, Richard and Liz have such confidence in their ability to provide their customers with a top-rate diving experience that they actually offer a money-back guarantee. After a day of diving with King Kamehameha Divers, if you can come back to the shop and look Richard and Liz in the eyes and say the diving was bad or the crew didn't treat you right, or you just didn't have a good time and you want your money back, Richard and Liz will refund your money, no questions asked.

After a year and a half of offering this guarantee, they have yet to refund a penny. But this shouldn't be surprising, because diving the Kona Coast is always a guaranteed good time.

For more information on Kona Coast diving, give Richard or Liz a call at (800) 525-PADI. King Kamehameha Divers is located in the Hotel King Kamehameha at 75-5660 Palani Rd., P-1, Kailua-Kona, HI 96740. □

John Brumm is the editor of PACIFIC DIVER.



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It was a fast ride to some unspoiled, out-of-the-way diving along the southern end of the Monterey Peninsula.



A Six-Pak to Point Sur

Article and photos by Lynd Stringer



Above left: Ventura rocks. Above: Xeno preparing for a day down at Point Sur.

It was early on a bright sunny morning when my dive partner Louisa, two other pairs of divers and I headed out of Monterey Harbor aboard the 34-foot "six-pak" dive boat *Xeno* for a day of adventure diving. (A six-pak is a boat licensed to take up to six paying passengers.) The sea was calm and the sky was clear as we raced down the coast, passing familiar dive spots like McAbee Beach and Lover's Point and Chase Reef. These were all good dive spots, but today we had planned to go down and explore some of the open water pinnacles off the rugged coastline of Point Sur.

At Point Pinos we turned south, leaving Monterey Bay behind as we headed into the long lazy swells of the open Pacific. We powered past Carmel Bay and Yankee Point, then in less than two hours we finally arrived off the coast of Point Sur. As we suited up *Xeno* skipper Jon Capella slowed down and began searching for a cluster of small submerged pinnacles just north of Point Sur. These particular pinnacles are seldom visited by divers because they're so hard to find. But Jon decided to give it a try. He turned on his fathometer and watched for position points on shore

as he searched the surrounding waters for the submerged pinnacles.

But alas, nature won out this time, and the pinnacles remained hidden. So Jon leaned on the throttles and turned north again as we retraced our course for Ventura Rocks.

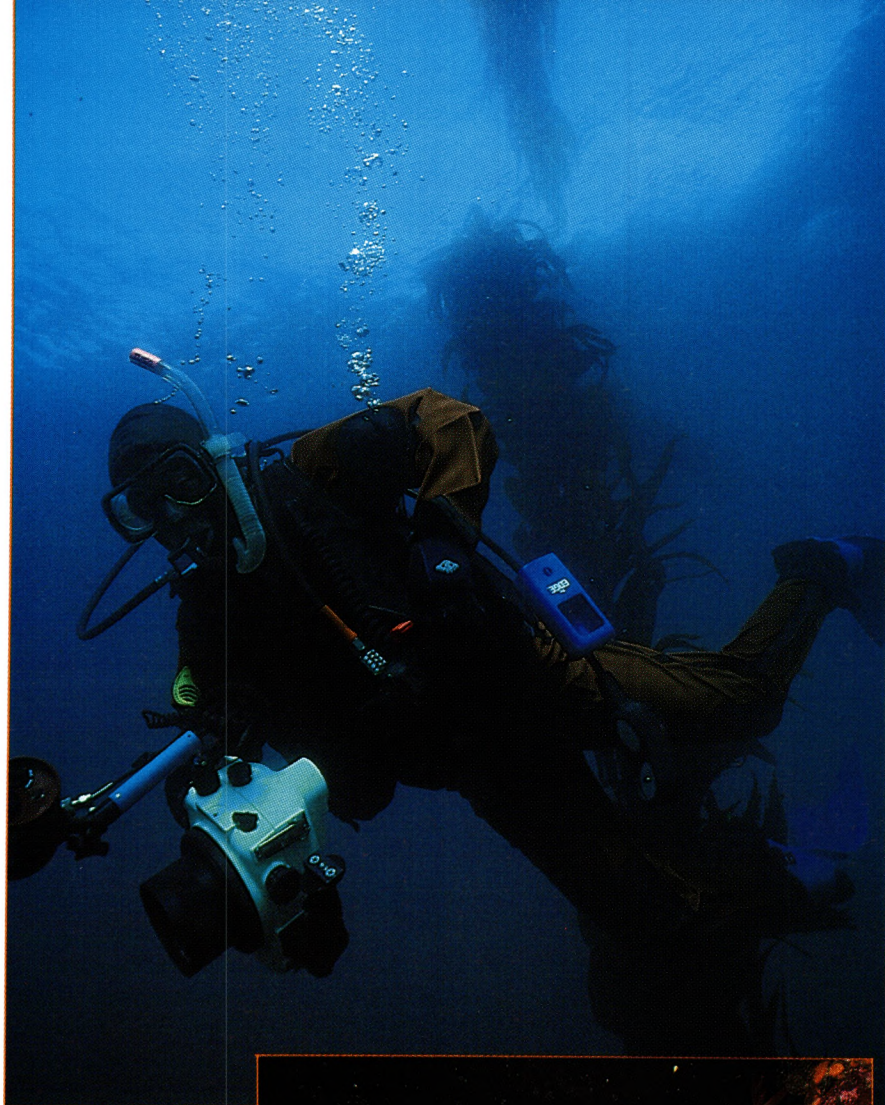
Ventura Rocks is another group of pinnacles located just north of Point Sur, but these break the surface so they are easy to find. The largest pinnacle juts 20 to 30 feet above the surface and is the gathering place for local sea lions.

Jon decided not to anchor *Xeno*. Instead, he prepared us for a drift dive. As he maneuvered close to the rocks, we giant-strided into the water in our diving teams. Then Jon backed *Xeno* away from the rocks and laid off at a safe distance until we surfaced.

When we hit the water the sea lions did too. They played tag with us as we prepared to descend, then followed us down to the depths. The underwater portion of the pinnacle was covered with anemones, hydrocorals and whip-like growths of brown alga. The blush-red and pastel-blue hydrocorals were as big around as footballs, reaching into the perpetual twilight

with their tiny rocky antlers. I found a small bush waving back and forth on the wall that I have never seen before, its 50-odd tips made up of smaller and smaller concentric circles like Christmas Tree worms.

As I swam around to the back side of the pinnacle the surface above me suddenly went black as if a dark cloud had descended over me. I looked over at Louisa, who was busy taking pictures, then checked my depth gauge which read 50 feet. Then suddenly it became clear; the dark cloud passing over my head was a huge wave breaking over the partially submerged pinnacle. The bubbles dis-



Above: the surge at Castle Rocks is reminiscent of the surge at Begg Rock near San Nicolas Island.



Green anemones are scattered among the rocks in the shallow waters of Point Joe.

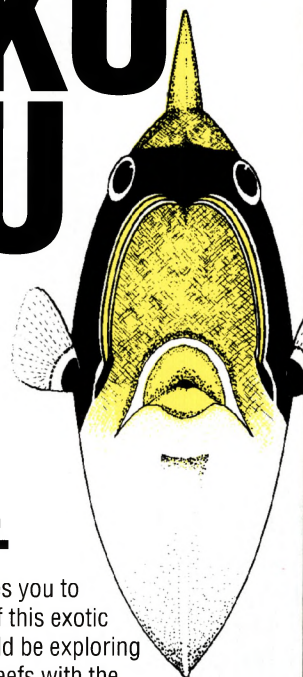
persed the light, acting like a giant blanket blocking the sun.

At the surface after our first dive we signaled Jon, who had been watching for us, and he steered *Xeno* over to pick us up. Grabbing onto the stern platform, we handed up our weightbelts and tanks and then climbed aboard.

As the other divers were climbing aboard *Louisa* and I went down into the cabin where we found snacks and hot water for coffee and hot chocolate. We had some coffee while we changed our camera lenses and film. Overhead the compressor rumbled as Jon filled our tanks up on the roof for the second dive.

By the time we climbed back out on deck again our tanks were filled and we had arrived at Castle Rocks for our second dive. We hit the water and swam down along the vertical walls. The surge was much stronger here, reminiscent of the surge out at Southern California's Begg Rock near San Nicolas Island. We swam along with the surge, then as it slowed we stopped and took a hand hold on the wall, then waited as the surged reversed direction. Letting go of the rocks, we let the surge whisk us one way and then the

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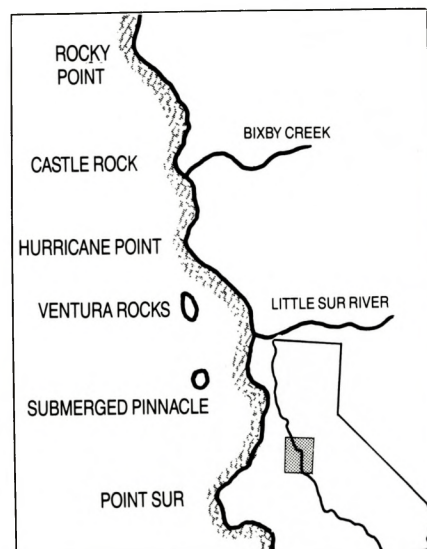
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other, always ending up in approximately the same position as when we started.

Surfacing and climbing back aboard *Xeno*, we waited for our tanks to be refilled as we traveled over to Point Joe, where we took our third and final dive of the day. Point Joe is a relatively shallow dive located between Carmel Bay and Point Pinos. We found the rocky bottom at about 40 feet with 20- to 50-foot-in-diameter pinnacles reaching to the surface. Rounding one pinnacle searching for photographs we ran into a curious sight: a nudibranch laying eggs beneath a starfish. We tried to figure out if the starfish was eating the nudibranch, or the egg case, or both. But before we could find the answer it was time to return to the surface. The early afternoon was waning as we reluctantly climbed on board and Jon turned *Xeno's* bow toward home.

On the ride back to Monterey Harbor we sat next to Jon and passed the time. Every few minutes he pointed out a three- to four-foot blue shark whose fins sliced the surface alongside the boat. As it turned out, among the specialty dives Jon offers are whale diving, where he drops divers on well-traveled whale routes, and shark diving from a cage, where apparently divers usually see blue sharks and occasional white sharks.

We motored past the Monterey Aquarium and the barking sea lions lined up along the breakwater, then turned into the harbor and headed for the wharf. As we gathered our gear and said our goodbyes to Jon Capella and our fellow passengers, it occurred to me that diving off of six-pak dive boats could get real habit-forming. Personal service, a selection of unusual dive spots, and no long swims. Yeah, I think I'm used to this already. □

Lynd Stringer is a free-lance writer and photographer based in the Monterey area.

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The Master Predator: I Get no Respect

By "Baja John" Francis

I've often suspected that with the right pair of dive fins and not too much weight you could actually walk on water. And now I can report that, yes, water walking is possible. But I'm getting ahead of my story.

I was at Isla Isabella, a two-by-four island just off the Mexican mainland about 240 miles east of Cabo San Lucas. Isabella and Cabo frame the gateway, so to speak, to the Sea of Cortez. They also represent the two extremes of Sea of Cortez diving. While at Cabo San Lucas nature seems as harmless and friendly as Disneyland's Dumbo ride, at Isla Isabella nature has a tendency to shove you around a little bit.

You're likely to find this out even before you get there. The local weather can be rough, and the island itself is just a chunk of volcanic debris with a sunken crater for an anchorage. You get the feeling nature allows you to stay at Isla Isabella only because it hasn't yet come up with something better to do with the place. Like blow it up again.

Before hitting the water I decided to go ashore to stretch my legs. It turns out Isabella is a famous nesting site for boobies and frigate birds. The boobies nest on the ground as thick as pigeons in the park, but when you walk among them they don't fly away. Instead they shift their weight a little nervously and squawk "Go away!"

The frigate birds nest on top of scrubby trees whose branches interlock to form a sort of roof six or eight feet above the ground. These are big, black, mean-looking birds, and there are thousands of them. They don't condescend to squawk; they just glare at you in disgust as you walk beneath them, as if wondering what kind of creature you are to walk around in the bottom of a bird cage.

Knowing when I'm not wanted (a feeling I have gotten on more than one occa-

sion in my travels), I decided to go back to the boat and get suited up for a little underwater exploring.

Isla Isabella has one of those classic reefs on its southeast side that fringes the shore for about a quarter mile, never more than 10 or 15 feet deep, so you can squeeze out lots of bottom time. The reef is decorated with all kinds of coral brains, branches and fans, and all sorts of tropical fish in their colorful clown suits.

Yeah, I took my pole spear with me, determined that this would be the dive that I'd finally bring back dinner. Those of you who've been following this column know that if I'd been depending upon my hunting ability to eat, I'd be one hungry Baja diver by now. I pretend I just don't have the killer instinct needed for hunting, that I'm too nice a guy to spear a fellow earth creature, but the truth is, these fish are a lot better at this game than I am. And, between you and me, I'm getting pretty pissed off about it.

Now a pole spear doesn't have much range, so the best bet is to get a fish cornered in a hole where it thinks it's safe; the hole, of course, being smaller than you are. But Isla Isabella doesn't get much diving pressure, so I figured these poor, dumb fish wouldn't know about pole spears, nor would they stand a chance against man, the Master Predator.

The reef looked good, lots of hidey-holes and crevices, with lots of fish swimming around them. A fat parrotfish raced in front of me and slipped into a hole under a big rock. Heh-heh. Now I've got him! I stuck my nose down near the entrance of the hole and...wait a minute, where the hell is he?

Okay, that hole had a back door. So I tried again. This time with a damselfish. Now there's not a lot of meat on a damselfish, but I figured I'd try anyway; if nothing



"Baja John."

else, I could get in some hunting practice.

An hour later I'd gotten in lots of hunting practice with the damsels but no fish. At least the parrotfish had the decency to act like they were afraid of me. I'd chase them in the front door and they'd haul ass out the back, hot-footing it over the fence and running for the woods, so to speak.

But those damselfish, they were just too irritating to bear. I'd chase one into a hole, and not seeing a back door to it, I'd keep my nose pressed to the opening, waiting for it to make its move. Then all of a sudden I'd get that feeling that there was something behind me, the same feeling I used to get back when I first started diving the waters of Southern California and I thought there was always a white shark following me around. Anyway, I got this feeling there was something behind me, so I turned around, and there was that damselfish looking over my shoulder the way my neighbor used to do when I worked on my car. I swear, the expression on that fish's face looked the same as my idiot neighbor when he'd say, "Well hey, have you checked the carburetor?"

So I swung around and shot at it, but it got away again. By this time I was determined to get me a damselfish. I wasn't even sure how good they were to eat, and I didn't care. I just wanted a little respect. I wanted to show them who the Master Predator was around here. So I hunted

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and hunted until I found a damselfish in a hole without a back door, looking out at me like a housewife looks at a smiling Jehovah's Witness standing on the other side of the front porch screen door. And I shot it dead.

I felt great. I was finally going to return from a hunt with something to show for my troubles. Kicking back to the boat, feeling every bit the Master Predator, I was on top of the world — until I looked down and saw the stream of blood seeping out of my soon-to-be-dinner. That stream of blood brought to mind that white shark that used to follow me around back in California. So with a jerk of my head I looked behind me. But of course there was nothing there. There are no white sharks in the Sea of Cortez, after all.

But what about other kinds of sharks? As I increased my swimming speed my mind searched back through my Baja fish books. I couldn't remember exactly. Was it hammerheads only, or were there other snaggle-toothed creatures wandering around these waters? Looking quickly behind me again, I picked up the pace.

I was closing on the boat but I was still leaving a heavy blood trail. I could just picture a pack of unrecognizable sharks snapping their jaws and yapping like mad dogs right on my trail. I looked around again, saw nothing. But I could feel them back there. I swear I could feel them. So I swam even faster.

Suddenly from the gloom behind me I caught sight of a black shadow approaching. It was coming right for me, and it was coming fast. I moaned into my mouthpiece as it caught up with me and crossed beneath me about a foot from my left thigh. It was a huge moray eel just cruising along the bottom, but I saw its wide opened JAWS, which made me flash on the movie, and that's when I decided to walk back to the boat.

Thinking back on it, I'd say walking on water is a matter of combining the right sized fins with the right body weight and the right motivation. My motivation, of course, was the Fear Factor, and it enabled me to slap across the surface in my jet fins those last 20 yards to the boat.

Of course nobody's going to believe this story, and I can't prove it because nobody else was there. But I walked on water; I surely did, just as surely as I used to have a white shark follow me around back in California. Come to think of it, now that I'm down here in the Sea of Cortez, I wonder who that old shark is following now? □

"Baja John" Francis is PACIFIC DIVER's S.O.B. contributing editor, covering the sport diving scene in the Sea of Cortez.

Ultimate Dive Industries' "Speargear"

It has been said that necessity is the mother of invention. And if you are into spearfishing you have probably wished, at one time or another, that you had both hands free instead of dedicated to holding onto your speargun. Now there's a solution to that dilemma, and it's called Speargear.

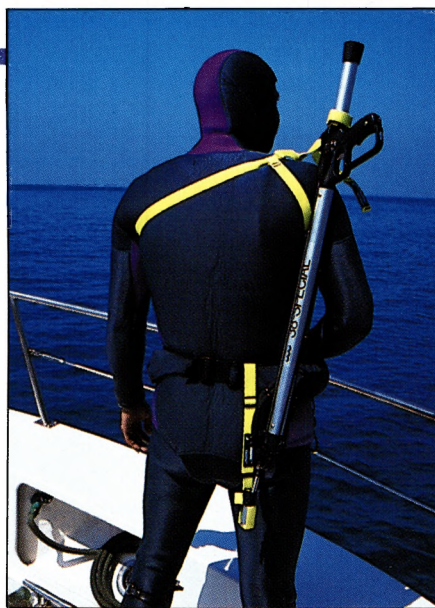
Speargear, from Ultimate Dive Industries (UDI), is a speargun holster used for securing your speargun during water entries and exits and while not using the speargun during a dive. Additionally, it can be used to tether the speargun while bagging or stringing your gamefish.

It's not a holster in the conventional sense where the speargun slides into a leather or fabric glove. Rather, it is a cleverly designed system of adjustable nylon straps with side-release buckles and velcro fasteners that work together to provide a simple, lightweight harness which secures the speargun in such a way that it can be quickly and easily deployed.

There are three basic components to the Speargear system: the Point-Holder, Gunstrap, and Bodystrap. The Point-Holder consists of an adjustable nylon strap loop and dangling metal cylinder that secures the tip of the spearshaft. The loop is adjustable, and for spearguns whose length from tip to butt are over 32 inches, is designed to fit over the weightbelt. The size of the loop can be adjusted to accommodate any type of weightbelt. For our test we used a lead shot style weightbelt, which has a greater girth than a regular weightbelt, and we had no problem in adjusting the Point-Holder to fit. The Point-Holder is positioned on the weightbelt where your right hip pocket would be. The end of the Point-Holder sports a male part side-release buckle which can be used to tether the speargun to the Gunstrap when bagging or stringing a fish. For spearguns less than 32 inches in length the Point-Holder can be attached to a D-ring on your BC.

The Gunstrap attaches to the butt of the speargun or to the pistol grip if there is no butt. It too is adjustable and sports a female part of a side-release buckle.

The Bodystrap is the third component of the system, and upon first sight, the most intimidating. We've never been very comfortable with an array of adjustable straps and loops. But a quick look at the supplied instructions clarified the situa-



Speargear's Bodystrap is worn over the wetsuit but under the BC.

tion. The Bodystrap is worn over the wetsuit (or drysuit) and under the BC. Once we became familiar with it there was no problem getting it on and adjusted properly. You simply slip your right arm through the loop and pass the long strap behind your back and under your left arm and across your chest where you buckle it to the short strap. There are slides on the long strap and on the loop strap that enable you to easily adjust the straps for a comfortable fit.

The third end of the Bodystrap, referred to as the Label Strap, is an adjustable strap tipped with a male part side-release buckle. When worn in the proper fashion this strap is located on your right shoulder and ultimately is secured to the Gunstrap on the butt or pistol grip of the speargun by way of the female part of the buckle on the Gunstrap.

To holster the speargun you place the spearpoint into the Point-Holder. A velcro strap serves as a guide. After securely seating the spearpoint in the Point-Holder you hold the free end of the speargun by the Gunstrap buckle and bring the butt end of the speargun behind the right shoulder. In that position the Gunstrap and the Label Strap are fastened together.

The speargun is secured in place by cinching down on the Label Strap. It may sound a bit complicated, but with a little practice it is a quick and easy maneuver. Once secured, the speargun can be deployed with two fingers by releasing the buckle on the Gunstrap and pulling the spearpoint free from the Point-Holder.

We were impressed with just how securely the speargun can be holstered. Giant strides over the side of a charter dive boat failed to dislodge the speargun from the holster. And although we didn't try entering or exiting from the beach, we feel confident that the holster would secure the speargun even if we found ourselves being tumbled in the surf.

The only problem encountered while using the Speargear was in re-holstering the speargun underwater. On the first attempt we had some trouble locating the Label Strap amid the hoses from the octopus and the BC. That was due to our failure to extend the Label Strap to its maximum length after deploying the speargun. In subsequent re-holsterings, with the Label Strap extended, it was considerably easier to locate. Another solution would be to fasten a simple float (such as a fishing bobber) to the end of the strap so that it floated above the BC and hoses.

We were quite impressed with the quality of the materials and workmanship used in the construction of the Speargear. One inch nylon webbing is used throughout along with one inch Velcro fasteners (which have nice non-Velcro tabs making fastening and unfastening an easy matter, even with gloved hands). Spun nylon thread is used for all stitching, with 42-stitch bar tacks and double or triple stitching at all stress points. All hardware is noncorrosive and corrosion resistant. And the whole assembly is extremely lightweight, weighing less than nine ounces. It is basically maintenance-free, requiring only a freshwater rinse before storing.

Speargear retails for \$34.95 in basic black. Custom colors are available by special order. Speargear carries a three year warranty to cover defects in workmanship and materials. It comes with a complete set of instructions which feature numerous photos for parts identification and for assembly and use, and a sporty Speargear decal to boot.

It should be noted that the Speargear setup we tested was for use with conventional band-type spearguns, and not pneumatics. UDI is working on the design and implementation of Speargear-2 for

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- ★★ A real disappointment
- ★ Forget about it.

PRODUCT REVIEWS

pneumatic spearguns. For further information contact Ultimate Dive Industries, 13337 E. South Street, Suite 377, Cerritos, CA 90701; (213)924-3181 or (714) 772-6979.

★★★★

I.S.T.'s Formosa Fins

The Taiwan-made "Formosa" is a lightweight diving fin with a modern flared blade. At first there doesn't seem to be anything unusual here. But look a little closer and you'll see that the blade design incorporates a half-dozen molded "baffles," three on each side of the blade, that enable you to more or less fine-tune the fin's thrust to match your individual kicking style. For example, you can position all the baffles along one side of the blade to maximize thrust on, say, the down stroke of your kick. Or you can position one, two or three baffles up, and the rest down, or any combination thereof, to balance your swimming attitude and get the most work out of the fin with the least amount of effort. It's an interesting idea, and it seems to work.

Beyond the fin blade, the Formosa has a comfortable foot pocket. Beware of I.S.T.'s sizing system, however. The fins come in



STEVE ESSIG

Fin blade baffles — an interesting idea, and it seems to work.

medium, large and extra large sizes, but they tend to be cut a bit larger than you might expect. Wearing a pair of large Formosa fins with size 10 bootied feet left some extra room in the pockets for our feet to slosh around in, which caused some unnecessary stress on the ankles. So try them on with booties before you buy.

Finally, we weren't wild about the strap

assembly. There's nothing inherently wrong with it; after all, it's your basic fin strap threaded through a plastic fitting that snaps onto a knob molded into each side of the fin pocket. There's just something about the assembly that doesn't inspire confidence. When we first looked at it, we would've bet money that the fitting was going to lose the strap adjustment, but it didn't. We also would've bet that either the strap fittings or the knobs on the fin weren't going to last through a dive. But again, we were wrong. The fins gave us no indication that any part was getting ready to give out after a half-dozen dives. So who knows, perhaps it's one of those fittings that only looks flimsy and will end up lasting forever.

One of the great things about the Formosa fin is its price. It retails for only about \$49, and comes in blue.

Apparently, I.S.T. Formosa fins are somewhat hard to find, so if you're interested in checking out this unusual adjustable baffles concept, you might have to contact Sports Kingdom, U.S. distributor for I.S.T.'s diving products, for a list of the dive stores that stock Formosa fins. Sports Kingdom is located at 15705 Arrow Hwy., Suite 7-A, Irwindale, CA 91706; (800) 522-8688. ★★ ★

READER SERVICE

APPAREL

1. **GURKEE'S INTERNATIONAL** — Chlorine and Saltwater resistant footwear.
2. **SAS WETSUITS** — The Titanium — a wetsuit that keeps you warmer — as much as 25 percent warmer than a conventional wetsuit.
3. **THUNDERWEAR** — Diving and other action sport gloves.

DIVE STORES

4. **BLACK BART'S AQUATICS** — Full dive store in El Toro.
5. **MARINA DEL REY DIVERS** — Sales, rentals and all levels of instruction.
6. **NATIONAL SCUBA** — Equipment sales, repair service and PADI Instruction.
7. **OLYMPIC AIR SERVICE** — Sales, service and parts store in Port Angeles, Washington.
8. **PACIFIC OFFSHORE DIVERS** — Full service dive store out of San Jose.
9. **SCUBA DUBA DIVE** — Full service dive store in Reseda.
10. **SILENT WORLD** — Full facility dive store in Seattle, Washington.

DIVE BOATS

11. **CLUB NAUTICO OF MONTEREY** — Boat charters and rentals: Powerboat rentals; 22-foot boats and 14-foot inflatables out of Monterey.
12. **GOLDEN DOUBLOON** — Dive boat out of San Pedro.
13. **HORIZON** — Dive boat out of San Diego.
14. **LEEWARD DIVE CENTER** — Dive boat & dive store in Oahu, Hawaii.
15. **KING KAMEHAMEHA** — Dive Boat & Dive Store in Kailua-Kona, Hawaii.
16. **KONA AGGRESSOR** — Luxurious dive boat out of Kona, Hawaii.
17. **R.C. DIVERS** — Dive boat information out of

San Diego.

18. **SUNDIVER** — Custom dive boat for Southern California divers.

19. **TRUTH AQUATICS** — Three custom dive boats out of Santa Barbara.

EQUIPMENT

20. **BEUCHAT** — Complete line of diving equipment.
21. **CETACEA** — Specialize in soft pouch weight belts, and other specialty products.
22. **DACOR CORPORATION** — Complete line of diving equipment.
23. **INNOVATIVE DESIGNS** — Compact, lightweight super snorkel for unlimited air supply.
24. **MARES USA** — Full line of diving equipment.
25. **PELICAN PRODUCTS** — Full line of flashlights.
26. **SCUDA** — Freedom from thirst, underwater drinking apparatus.
27. **SHERWOOD WEST** — Complete line of diving equipment.
28. **SPORTS KINGDOM INC.** — Send for product information.
29. **TABATA, U.S.A.** — Complete line of diving equipment.
30. **ULTIMATE DIVE INDUSTRIES** — The ultimate dive accessory for all divers, a speargun holster.
31. **ZEAGLE SYSTEMS, INC.** — Proven regulator design and power/oral inflator in one unit.

PHOTOGRAPHY

32. **ABC PHOTO** — Camera repair, rentals, service, sales and instruction.
33. **CAMERA TECH** — Camera repair, rentals, service, sales and instruction.
34. **JIM CHURCH UNDERSEA PHOTOGRAPHY** — Seminars on underwater photography plus exclusive trips.
35. **PACIFIC CAMERA SERVICE** — Nikonos specialist, free information on lens, camera and

flash repair.

RESORTS & TRAVEL

36. **CATALINA DIVING RESORTS** — Boat & shore diving packages from Catalina Island.
37. **CENTRAL PACIFIC DIVERS** — Deluxe dive package in Lahaina, Hawaii.
38. **OCEAN QUEST INTERNATIONAL** — Cruise ship with the '90s style of comfort and luxury.
39. **HOTEL PUNTA PESCADERO** — A Baja resort hotel paradise, located between Cabo and La Paz.
40. **SMALL HOPE BAY LODGE** — Twenty beach front cottages on Andros Island, Bahamas.
41. **SCUBA WORLD TRAVEL** — Experienced scuba diving travel to anywhere in the world.
42. **TROPICAL ADVENTURES** — Travel coordination for exciting dive trips.

TRAINING & EDUCATION

43. **NAUI** — NAUI leadership training, instructor, divemaster, skin diving leader.
44. **PADI INTERNATIONAL COLLEGE** — Full dive center and training facility.
45. **SANTA BARBARA CITY COLLEGE** — 8-page brochure and handout on their marine technology program.
46. **SPORT CHALET** — Brochures on dive boat schedules, travel schedules and classes.
47. **STAN'S SKIN DIVING SHOP** — Information on dive boats and certification programs.

MISCELLANEOUS

48. **DAN (Divers Alert Network)** — A membership that makes diving safer — every time. Send for more information.
49. **PORT-A-MARINE** — Full service for Achilles, Avon, Novurania Inflatables. Mercury & Yamaha outboards and custom accessories.

Circle the appropriate number on the attached reader service card.

DIVE TRAVEL NEWS

Amigos del Mar Caters to Cabo San Lucas Dive Travelers

Located across from the sportfishing dock in Cabo San Lucas, only a two-hour flight from Los Angeles, Amigos Del Mar has been offering snorkeling and scuba tours to visiting divers for over 10 years.

Scuba tours begin with a trip to the arch and the sea lion colony at Land's End. Just off the point at Land's End there's a Japanese shipwreck in about 60 feet of water as well as sea lions, turtles, huge sea bass and jewfish.

From there, divers have a choice of over a dozen other dive sites, including Anegada Rock, on the edge of the submarine canyon which forms San Lucas Bay, and La Largo, which is a series of canyons in 60 to 100 feet of water where you'll find the largest of Cabo's two famous sand falls. Here there are lots of gorgonians and sea fans, octopuses, tropicals, and schools of barracuda and other pelagics.

Day rates are \$35 for a one-tank dive;



RICK BAKER

\$55 for two tanks (minimum of two people) and \$45 for a night dive. All dive tours include a boat (either a pontoon boat or one of two modified trimarans 33 feet wide by 36 feet long), an English speaking guide, tanks, weights, backpacks, beers and sodas. All necessary scuba equipment can be rented with any dive tour for an additional \$10 per person per day.

For divers looking for more extended dive trips, Amigos del Mar also offers trips to Cabo Pulmo and Gorda Banks.

Open daily from 8:30 a.m. to 4:30 p.m., for more information contact Amigos Del Mar at P.O. Box 43, Cabo San Lucas, B.C.S. Mexico; phone number 3-05-05, or call the U.S. reservations office at (800) 447-8999.

Undersea Hunter Now Cruising the Waters off Coco Island

See & Sea Travel of San Francisco has announced the debut of the 90-foot *Undersea Hunter* for Coco Island, Costa Rica, cruises beginning November 6, 1990.

Undersea Hunter is owned and managed by Avi and Orly of Palau fame. Their former vessel *Sun Tamarin* is still one of the Pacific's most successful live-aboards.

Beginning in November, the new vessel will welcome groups of up to 14 divers on full-scale Coco Island expeditions, designed in the same pattern as those dive expeditions offered by the *Okeanos Aggressor*.

For more information, contact See & Sea Travel, Inc., 50 Francisco St., Suite 205, San Francisco, CA 94133; (415) 434-3400.

Jim Church's Solomon Islands Trip Rescheduled

Due to a change in airline schedules, the Solomon Islands Photo Expedition aboard the 121-foot *Bilikiki* has been rescheduled from July 26 to August 2, to December 8-15, 1990. The expedition is designed for experienced underwater photographers, using both still and video formats, and features diving planned specifically for photographers as well as photo coaching by Jim Church. For more information, contact See & Sea Travel at (800) DIV-XPRT.

(Continued)

Ocean Spirit Gets New Director, Becomes SSI Facility

Bruce Globerman has been appointed Director of Aquatics on the M/V *Ocean Spirit*, the world's only specialized dive/cruise vessel. He will supervise the 24 dive masters, watersport instructors, boat captains and technicians that run the dive operation, the 10 dive boats, the recompression chamber, the sales and rental service and the world's largest compressed air system.

Globerman replaces Bret Gilliam whom he had joined in March 1989 when the program was initiated. He is certified through NAUI, PADI and SSI. His scuba experience includes instructor positions with Club Med in Martinique, Cancun and the Bahamas as well as extensive diving in California.

In addition to Globerman's appoint-

ment, *Ocean Spirit* recently became a full SSI member facility, upgrading its affiliation with SSI from an associate member to full membership. This transition now enables *Ocean Spirit* instructors to teach SSI divers up to the Divecon level, conduct SSI referrals, teach full SSI certification courses and conduct SSI advanced and specialty courses.

The dive/cruise ship departs every Sunday from St. Petersburg, Florida, for a seven-day trip to the Bay Islands of Guanaja and Roatan, Belize and Cozumel, enabling divers the opportunity to log up to 15 dives during the week-long adventure.

For more information or reservations, contact Ocean Quest Intl. at 512 Peters St., New Orleans, LA 70130; (800) 338-3483, or (504) 586-8686.





CATALINA RESORTS

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Just 26 miles off Los Angeles is magnificent Catalina...varied, colorful, clear water, marine life rich diving.

The Hotel MacRae, Bayview and Edgewater Hotels welcome divers. Groups, classes & families choose boat and shore diving plus specialty instruction (like shark cage diving) from Bob Kennedy's King Neptune.

Value-priced packages with boat transportation, hotel & diving available. Write: Catalina Resorts, P.O. Box 1017, Avalon, CA 90704.

In CA 1-800-262-3483 or (213) 510-0372



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Santa Barbara
California 93109-2394
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Jerry Clouser
(805) 965-0581
ext. 426



Photo by Steve Barsky



DIVE TRAVEL NEWS

Western Australia Dive Operation Offers Weekend Packages

Near Albany in western Australia, Southcoast Diving Supplies and Southern Ocean Charters is now offering weekend packages for divers aboard the M/V *Pamela*. One of the dives is to the *Cheyne III* whaler that was scuttled in 1982 as a dive wreck.

The diving expeditions cost approximately \$225 for the entire weekend. Information on Southcoast's weekend dive packages or any other watersports in western Australia can be received by writing the Western Australia Tourism Commission at 2121 Avenue of the Stars, Suite 1210, Los Angeles, CA 90067.

M/Y Coral Star Moves to the Bahamas

After four years in the eastern Caribbean, *Coral Star* is now sailing from Bahamian ports on five- and seven-day adventure cruises. The new itinerary offers divers an opportunity to swim with dolphins, observe sharks, dive with humpback whales and visit uninhabited islands. The vessel is fully equipped for watersports activities such as diving, snorkeling, windsurfing and sailing.

For more information, contact Coral Bay Cruises at 17 Fort Royal Isle, Fort Lauderdale, FL 33308; (800) 433-7262.

Fantasea Cruises Goes After the Upscale Dive Market

Fantasea II is a 115-foot luxury live-aboard with a crew of eight offering adventure dive cruises in the exotic waters of the Red Sea.

Appointed with all the finest furnishings and accompaniments, the vessel provides facilities for 16 guests in custom-decorated cabins. Designed for the well-to-do diver, *Fantasea II* offers full satellite communications, a telex, telefax, computer and photocopying facilities along with its array of watersports equipment, including windsurfing, waterskiing, deep-sea fishing and full diving facilities.

Fantasea II for well-to-do divers.



DIVE TRAVEL NEWS

Fantasea Cruises operates a U.S. office at 2409 23rd St., Santa Monica, CA 90405; (213) 392-8054.

New "Jamaqua" Style Dive Facilities Offered on Jamaica

Club Caribbean, Jamaica's mid-north coast beach resort, now offers dive facilities and attractively priced dive packages through its associate watersports concern, Jamaqua. Located on Club Caribbean property, a 116-room hotel complex located between Ocho Rios and Montego Bay, Jamaqua's nine person diving staff includes a dive master and an accredited dive instructor. There are three scheduled dives per day, with a choice of over 15 different dive sites ranging in depth from 30 to 120 feet.

Summer packages start at \$248 for three nights/two dives (per person, per day, double occupancy) and include accommodations in individual "rondavel" cottages, breakfast, dinner and taxes, as well as access to snorkeling, sailing, wind-surfing and waterskiing.

For more information, call Club Caribbean at (809) 973-3507 or phone the International Travel and Resorts dive desk at (800) 223 9815.

Special Off-Season Dive Packages at USVI's Hyatt Regency

The 264-room Hyatt Regency St. John in the U.S. Virgin Islands, formerly known as the Virgin Grand Beach Hotel, is offering 1990 off-season dive packages through December 19. The three-night "Dive Into It" packages are priced from \$419 per person, double occupancy, in the summer (June 1 to Sept. 30) and \$439 per person, double occupancy, May 1-31 and October 1 to December 19. Seven-night packages are \$919 and \$969. All packages include a two-tank dive each morning (except for arrival and departure days) and one night dive. Scheduled dives also include backpacks, weights, belts, tanks and air.

In addition to diving, the packages include a full American breakfast daily, unlimited use of all watersports equipment, unlimited day and night tennis and transfers from the St. Thomas airport to the hotel. Nondiving traveling companions receive a reduction on the package price.

Hyatt Regency St. John is located on 34 acres with its own quarter mile of sandy beach on Great Cruz Bay. For reservation and information from the U.S. call Hyatt Worldwide Reservations at (800) 233-1234. □

GOLDEN DOUBLOON



CATALINA BACKSIDE TRIP

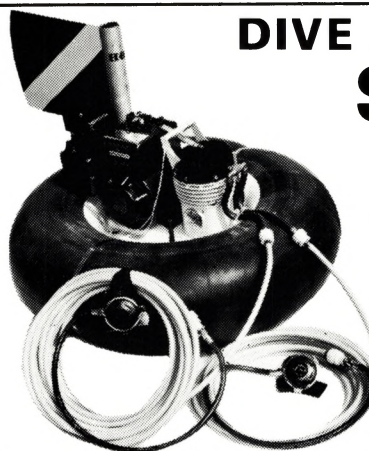
EVERY WED. \$50⁰⁰

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141 West 22nd St.
San Pedro, CA 90731 963-4378



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Catalina Island

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Aug. 11, Aug. 15

Santa Barbara Island

Aug. 26

San Clemente Island

July 22

Now is the time to upgrade your skills and
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Advanced classes start monthly.

Rescue class starts July 10.



Everything for your scuba pleasures including a full range of
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34145 Pacific Coast Highway
Dana Point, CA 92629
(714) 496-5891

EL TORO
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El Toro, CA 92630
(714) 855-2323



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SANDALS**

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NEXT ISSUE: PACIFIC DIVER TAKES A LONG
DIVING WEEKEND IN CABO SAN LUCAS. DON'T
MISS IT!



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DIVE BOAT SCHEDULES

MONTEREY

Cypress Sea, 408/244-4433
50/20 Divers/Capt. Tim Smith
All trips to Monterey/Carmel areas.
Available daily.

July:

- 1 Any Water Sports, 408/244-4433
- 7 Steele's Dive Store, 415/682-5082
- 8 Any Water Sports, 408/244-4433
- 14 Divemasters, 415/969-7782
- 15 Anchor Shack, 415/825-4960
- 20 Any Water Sports, 408/244-4433
- 21 Wallin Dive Store, 415/369-2131
P.M. M. McGuire class, 408/244-4433
- 22 Fremont Scuba, 415/438-9196
P.M. Tom Condy class, 408/244-4433
- 28 Ocean Odyssey, 916/758-3483
P.M. Frank Barry class, 408/244-4433
- 29 Any Water Sports, 408/244-4433
P.M. Anchor Shack, 415/825-4960

August:

- 4 Steele's Dive Store, 415/682-5082
- 5 Any Water Sports, 408/244-4433
- 11 Divemasters, 415/969-7782
- 12 Flipper Dippers, 408/280-1010
- 17 Any Water Sports, 408/244-4433
- 18 Wallin Dive Store, 415/369-2131
P.M. Frank Barry class, 408/244-4433
- 19 Anchor Shack, 415/825-4960
- 25 Ocean Odyssey, 916/758-3483
- 26 Fremont Scuba, 415/438-9196

September:

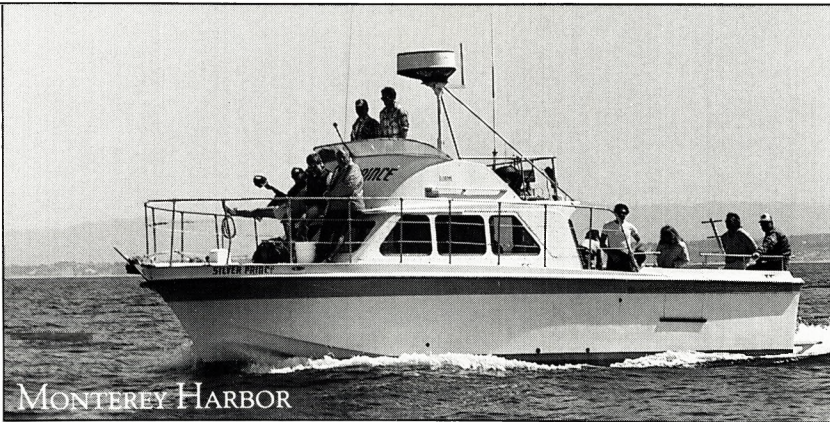
- 1 Steele's Dive Store, 415/682-5082
- 2 Any Water Sports, 408/244-4433
- 3 Anchor Shack, 415/825-4960
- 8 Divemasters, 415/969-7782
- 9 Any Water Sports, 408/244-4433
- 15 Wallin Dive Store, 415/369-2131
- 16 Anchor Shack, 415/825-4960
- 22 Ocean Odyssey, 916/758-3483
- 23 Fremont Scuba, 415/438-9196
- 29 Any Water Sports, 408/244-4433
- 30 Any Water Sports, 408/244-4433

Silver Prince, 408/394-4235
Monterey Wharf II

40/15 Divers/Capt. Gary Goulart
Call number above for open boats.

July:

- 1 A.M. Amer Aquatic Adventures, 209/578-0515
P.M. Landfall Productions, 415/651-6499
- 6 Open Boat
- 7 A.M. Pinnacles Dive Center, 415/897-9962
- 8 A.M. Stan's Dive Shop, 408/998-0767
P.M. Olympic Dive & Travel, 415/933-6045
- 13 Open Boat
- 14 A.M. Undersea Adventures, 415/838-2348
- 15 All Day: Scuba Town, 415/939-3483
- 20 Open Boat
- 21 A.M. Valley Aquatics, 209/527-2822
P.M. Pacific Offshore Divers, 408/265-3483
- 22 A.M. Stan's Dive Shop, 408/998-0767
P.M. Olympic Dive & Travel, 415/933-6045
- 27 Open Boat
- 28 All Day: Bamboo Reef, 415/362-6694
PDC Connie Night Dive, 415/965-8302



MONTEREY HARBOR

- 29 A.M. Valley Skin & Scuba, 209/333-2343
P.M. Undersea Adventures, 415/838-2348

August:

- 3 Open Boat
- 4 A.M. Pinnacles Dive Center, 415/897-9962
P.M. Scuba Plus, 209/957-2822
- 5 A.M. Get Down Divers, 408/438-3795
P.M. Olympic Dive & Travel, 415/933-6045
- 10 Open Boat
- 11 Undersea Adventures, 415/838-2348
- 12 A.M. Valley Skin & Scuba, 209/333-2343
P.M. Tri Valley Scuba, 415/828-5604
- 17 Open Boat
- 18 A.M. Valley Aquatics, 209/527-2822
P.M. Pacific Offshore Divers, 408/265-3483
- 19 All Day: Scuba Town, 415/939-3483
- 24 Open Boat
- 25 Bamboo Reef, 415/362-6694
Bamboo Reef Night Dive, 415/362-6694
- 26 A.M. Stan's Dive Shop, 408/998-0767
P.M. Undersea Adventures, 415/838-2348
- 31 Open Boat

September:

- 1 A.M. Pinnacles Dive Center, 415/897-9962
P.M. Scuba Plus, 209/957-2822
- 2 Get Down Divers, 408/438-3795
- 3 All Day: Monterey Sunfish, 408/294-4235
- 7 Open Boat
- 8 All Day: San Francisco Reef Divers, 415/387-2604
- 9 Landfall Productions, 415/651-6499
- 14 Open Boat
- 15 A.M. Undersea Adventures, 415/838-2348
P.M. Pacific Offshore Divers, 408/265-3483
- 16 All Day: Scuba Town, 415/939-3483
- 21 Open Boat
- 22 Monterey Bay Sea Otters
- 23 A.M. Stan's Dive Shop, 408/998-0767
P.M. Olympic Dive & Travel, 415/933-6045
- 28 Open Boat
- 29 Bamboo Reef, 415/362-6694
- 30 Valley Aquatics, 209/527-2822

Xeno, 408/426-7376

38/6 Divers/Capt. Jon Capella
Available seven days a week.

SANTA BARBARA

Conception, 805/962-1127, 805/963-3564

Sea Landing Breakwater
75/40 Divers/Capt. Jerry Boylan

July:

- 1-2 Aqua Adventures, 818/848-2163
- 3-7 Truth Aquatics Dive, 805/962-1127
- 8-9 Original Steeles (1/2), 415/655-4344
Pinnacles Dive Center (1/2), 800/223-4837
- 10-12 Available for Charter, 805/962-1127
- 13-14 San Diego UPS, 619/560-5621
- 15-16 Any Water Sports, 408/244-4433
- 19-21 Stu's Scuba Tours, 415/686-6111
- 22-24 Scuba Discoveries, 415/777-3483
- 26-28 High Sierra Divers, 916/477-7642
- 29-31 Sports Cove, 707/448-9454

August:

- 2-4 Ocean Odyssey, 916/758-3483
- 5-7 Tom Campbell's Dive & Travel, 805/965-4951
- 9-11 Bamboo Reef, 415/362-6694
- 12-16 Truth Aquatics Dive, 805/962-1127
- 17-18 Discovery Charters, 818/790-8276
- 19-21 Dolphin Dive Club, 916/987-1303
- 23-25 Stu's Scuba Tours, 415/686-6111
- 26-27 Desert Divers Supply, 702/438-1000
- 31-9/3 Aqua Adventures, 818/848-2163

September:

- 4-6 Available for Charter, 805/962-1127
- 7-8 Wet Pleasure, 408/984-5819
- 9-11 Marin Skin Diving, 415/479-4332
- 12-13 Available for Charter, 805/962-1127
- 14-15 Dave Faught, 408/446-5416
- 16-18 Moose Lodge Dive Tours, 408/446-4074
- 20-22 Cal School of Diving, 415/644-2373
- 23-24 Dive West, 805/925-5878
- 28-30 Bill Finstad, 408/426-2498

Truth, 805/962-1127, 805/963-3564

Sea Landing Breakwater
68/40 Divers/Capt. Bill Yznaga
Call numbers above for open boats.

July:

- 1-3 Lodi Valley Skin Diving (1/2), 209/333-2343
Olympic Scuba School (1/2), 415/933-6045
- 4 Open Boat
- 5 Open Boat
- 6-7 Desert Divers Supply, 702/438-1000
- 8-10 Available for Charter, 805/962-1127
- 11 Open Boat
- 12 Open Boat
- 13-14 Truth Aquatics Dive, 805/962-1127
- 15-17 Available for Charter, 805/962-1127
- 18 Open Boat
- 19 Open Boat
- 20-21 Glendale UPS, 213/485-6008
- 22-24 Available for Charter, 805/962-1127
- 25 Open Boat
- 26 Open Boat
- 27-28 Aqua Adventures, 818/848-2163

- 29-30 Truth Aquatics Dive, 805/962-1127

August:

- 1 Open Boat
- 2 Open Boat
- 3-4 Hughes Scuba Club, 213/324-8583
- 5-7 Ocean Odyssey, 408/475-3483
- 8 Open Boat
- 9 Open Boat
- 10-11 Wet Pleasure, 408/984-5819
- 12-13 Fremont Dive Center, 415/657-1004
- 14 Chamber Day, 714/545-3855
- 15 Open Boat
- 16 Open Boat
- 17-18 Aqua Adventures, 818/848-2163
- 19-20 Aquatics of Santa Barbara, 805/964-8689
- 22 Open Boat
- 23 Open Boat
- 24-25 Sea Sabres, 213/947-0625
- 26-27 Divers Corner, 213/869-7702
- 28-31 Kerry Beerman, 206/952-7971

September:

- 1-3 Blue Fins Dive Club, 213/391-0948
- 5 Open Boat
- 6 Open Boat
- 7-8 Sea Sons (1/2), 714/735-3284
BENT Dive Club (1/2), 213/375-7121
- 9-10 Hughes Dive Club, 213/324-8583
- 12 Open Boat
- 13 Open Boat
- 14-15 Cypress College, 213/424-9288
- 16-17 Stu's Scuba Tours, 415/686-6111
- 19 Open Boat
- 20-22 Stu's Scuba Tours, 415/686-6111
- 23-24 Dive 'N Surf, 213/372-8423
- 26 Open Boat
- 27-29 Ocean Funatics, 408/427-1620

Vision, 805/962-1127, 805/963-3564

Sea Landing Breakwater
90/40 Divers/Capt. Robbie Church

July:

- 1-4 Bill Finstad, 415/949-0344
- 6-7 Tom Campbell's Dive & Travel, 805/965-4951
- 8-10 Interocean Tours, 415/444-5833
- 12-14 Stu's Scuba Tours, 415/686-6111
- 15-17 Marin Skin Diving, 415/479-4332
- 18 Catalina Chamber Day
- 19-21 Discovery Charters, 818/790-8276
- 22-24 Stu's Scuba Tours, 415/686-6111
- 26-28 Bill Finstad, 415/949-0344
- 29-30 Original Steeles (1/2), 415/655-4344
Pinnacles Dive Center (1/2), 800/223-4837
- 31-8/4 Dublin Scuba Center, 415/833-2518

August:

- 5-7 Stu's Scuba Tours, 415/686-6111
- 9-11 San Francisco UPS, 415/337-0306
- 12-13 Aqua Nuts, 805/541-3761
- 14-16 Dave Faught, 408/446-5416
- 19-23 Anchor Shack, 415/825-4960
- 24-28 Bill Finstad, 408/426-2498
- 31-9/4 Adventure Sports, 408/458-3648

September:

- 6-8 Any Water Sports, 408/244-4433
- 9-11 Inter Ocean Tours, 415/444-5833
- 13-15 San Diego UPS, 619/560-5621
- 16-18 Scuba Discoveries, 415/777-3483
- 19-20 Orca Industries, 800/365-4913
- 21-22 Discovery Charters, 818/790-8276
- 23-24 Stu's Scuba Tours, 415/686-6111
- 25-27 Available for Charter, 805/962-1127
- 28-30 Stu's Scuba Tours, 415/686-6111

VENTURA

Chieftain, 805/652-0321

Ventura Harbor
50/20 Divers/Capt. David Rentfrow
Call number above for open boats.

July:

- 1 Santa Cruz: Open Boat
- 4 Santa Cruz: Open Boat
- 6 Santa Cruz: Open Boat
- 7 Santa Cruz/Anacapa: Malibu Divers, 213/456-2396
- 8 Santa Cruz: Open Boat
- 11 Anacapa: Open Boat
- 13 Santa Cruz: Open Boat
- 14 Santa Cruz: Open Boat
- 15 Santa Cruz: Open Boat
- 18 Santa Cruz: Open Boat
- 20 Santa Cruz: Open Boat
- 21 Santa Cruz: Open Boat
- 22 Santa Cruz/Anacapa: Open Boat
- 25 Santa Cruz: Open Boat
- 27 Santa Cruz: Open Boat
- 28 Santa Cruz: Open Boat
- 29 Santa Cruz/Anacapa: Open Boat

August:

- 1 Santa Cruz: Open Boat
- 2 Chamber Day
- 3 Santa Cruz: Open Boat
- 4 Santa Cruz/Anacapa: Malibu Divers, 213/456-2396
- 5 Santa Cruz: Open Boat
- 8 Santa Cruz: Open Boat
- 10 Santa Cruz: Open Boat
- 11 Santa Cruz: Open Boat
- 12 Santa Cruz: Open Boat
- 15 Santa Cruz: Open Boat
- 17 Santa Cruz: Open Boat
- 18 Santa Cruz/Anacapa: Cedar Sinai Medical
- 19 Santa Cruz/Anacapa: Open Boat
- 22 Santa Cruz: Open Boat
- 24 Santa Cruz: Open Boat
- 25 Santa Cruz: Open Boat
- 26 Santa Cruz/Anacapa: Open Boat
- 29 Santa Cruz: Open Boat
- 31 Santa Cruz: Open Boat

September:

- 1 Santa Cruz: Open Boat
- 2 Santa Cruz: Open Boat
- 3 Santa Cruz: Open Boat
- 5 Santa Cruz: Open Boat
- 8 Santa Cruz/Anacapa: Malibu Divers, 213/456-2396
- 9 Santa Cruz: Open Boat
- 12 Santa Cruz: Open Boat
- 15 Santa Cruz: Open Boat
- 16 Santa Cruz: Open Boat
- 19 Santa Cruz: Open Boat
- 22 Santa Cruz: Open Boat
- 23 Santa Cruz: Open Boat
- 26 Santa Cruz: Open Boat
- 29 Santa Cruz: Open Boat
- 29 Santa Cruz: Open Boat

Liberty, 805/483-6612, 805/642-1233

Ventura Harbor Village
85/40 Divers/Capt. Phil Bardini
Call number above for open boats.

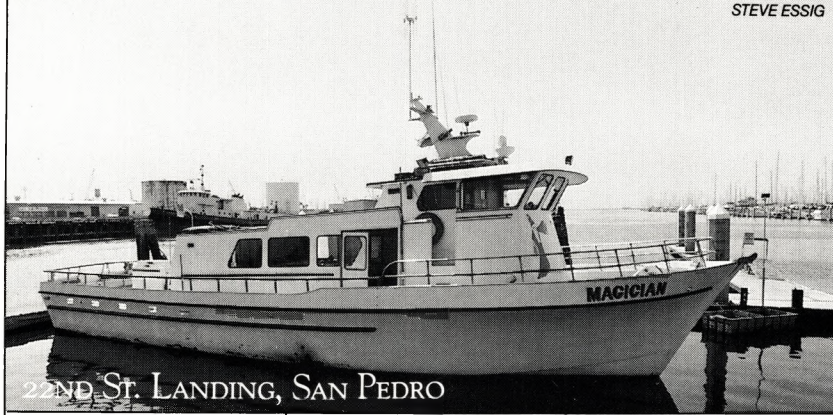
July:

- 1 Youngs Dive Shop, 213/424-9965
- 7 Anacapa/Santa Cruz: Open Boat
- 8 Santa Rosa: Marina del Rey Divers, 213/827-1131

(Continued)

DIVE BOAT SCHEDULES

STEVE ESSIG



22ND ST. LANDING, SAN PEDRO

- 14 Anacapa/Santa Cruz: Santa Barb. Aquatics, 805/964-8689
- 15 San Miguel (island excursion only): Island Packers, 805/642-1393
- 21 Anacapa/Santa Cruz: Open Boat
- 22 Anacapa/Santa Cruz: West Coast Divers, 818/708-8137
- 28 Anacapa/Santa Cruz: Open Boat
- 29 Anacapa/Santa Cruz: Pt. Hueneme Aquatics, 805/984-3483

August:

- 4 Anacapa/Santa Cruz: Inner-space Divers, 805/399-1425
- 5 Anacapa/Santa Cruz: Capt. Frog, 805/833-3781
- 11 Anacapa/Santa Cruz: Santa Barb. Aquatics, 805/964-8689
- 12 Anacapa/Santa Cruz: Blue Cheer, 213/828-1217
- 18 Anacapa/Santa Cruz: West Coast Divers, 818/708-8137
- 19 Anacapa/Santa Cruz: Desert Scuba, 714/948-8883
- 25 Anacapa/Santa Cruz: Blue Cheer, 213/828-1217
- 26 Anacapa/Santa Cruz: Pt. Hueneme Aquatics, 805/984-3483

Peace, 805/658-8286

Ventura Harbor Village
65/32 Divers/Capt. Bill Magee,
Mike Roach
Call number above for open boats.

July:

- 1-3 World Sea Adventures, 916/487-7433
- 4 Santa Cruz: Open Boat
- 5-7 World Sea Adventures, 916/487-7433
- 8-9 Santa Monica Bluefins, 805/499-6929
- 11 Gull Island: Open Boat
- 12 Santa Cruz: Open Boat
- 13-14 Scuba Escape, 213/391-3119
- 15-16 5 Star Instructional Group, 213/456-3483
- 18 San Miguel: Open Boat
- 19 Santa Cruz: Open Boat
- 20-22 World Sea Adventures, 916/487-7433
- 24-25 Santa Cruz/Santa Rosa: 6th Annual Halibut Hunt, 805/958-8286
- 26 Santa Cruz: Open Boat
- 27-28 5 Star Instructional Group, 213/456-3483
- 29-30 Island Packers, 805/642-1393

August:

- 1 Santa Rosa: Open Boat
- 2 Santa Cruz: Open Boat
- 3-4 Mariners, 818/367-8992
- 5-6 Scuba Duba Dive, 818/881-4545
- 8 Begg Rock: Open Boat
- 9 Santa Cruz: Open Boat
- 10-11 5 Star Instructional Group, 213/456-3483
- 12-13 Island Packers, 805/642-1393
- 15 Santa Rosa: Open Boat
- 16 Santa Cruz: Open Boat
- 17-19 Pinnacles Dive Center, 415/897-9962
- 22 Santa Cruz: Halibut Hunt, 805/658-8286
- 23 Santa Cruz: Open Boat
- 24-25 Channel Islands Scuba, 805/644-3483
- 26-27 Island Packers, 805/642-1393
- 29 San Miguel: Open Boat
- 30 Santa Cruz: Open Boat
- 31-91 5 Star Instructional Group, 213/456-3483

September:

- 2-4 World Sea Adventures, 916/487-7433
- 5 Anacapa: Open Boat
- 6 Santa Cruz: Open Boat
- 7-9 ASB Undersea, 415/485-1700
- 12 San Miguel: Open Boat
- 13 Santa Cruz: Open Boat
- 14-15 TRW, 213/372-7764
- 16-17 San Diego Shell Club, 619/792-5404
- 19 Santa Rosa: Open Boat
- 20 Santa Cruz: Open Boat

- 21-22 LA UPS, 213/545-0513
- 23-24 Pinnacles Dive Center, 415/697-9962
- 26 San Nicolas: Open Boat
- 27 Santa Cruz: Open Boat
- 28-29 5 Star Instructional Group, 213/456-3483
- 30-10/1 Island Packers, 805/642-1393

Scuba Luv'er, 818/346-4799

Ventura Harbor Village
65/40 Divers/Capt. Len Bergeson
Call number above for Scuba Luv'ers.
July:

- 1 Santa Cruz Wrecks: Scuba Luv
- 4 Mid-Week Special: Scuba Luv
- 6 Shark Dive: Scuba Luv
- 7 Painted Caves: Scuba Luv
- 8 Anacapa/Santa Cruz: Scuba Luv
- 11 Mid-Week Special: Scuba Luv
- 13 Cavern Point: Scuba Luv
- 14 Anacapa/Santa Cruz: Capt. Frog, 805/833-3781
- 15 Potato Rock: Scuba Luv
- 18 Mid-Week Special: Scuba Luv
- 20 Shark Photo Dive: Scuba Luv
- 21 Closed Charter
- 22 Santa Cruz Wrecks: Scuba Luv
- 25 Mid-Week Special: Scuba Luv
- 27 Anacapa Pinnacles: Scuba Luv
- 28 Anacapa: Sport Chalet, 818/790-9800
- 29 Yellow Banks: Scuba Luv

August:

- 1 Mid-Week Special: Scuba Luv
- 3 Shark Photo Dive: Scuba Luv
- 4 Santa Barbara: Scuba Luv
- 5 Cavern Point: Scuba Luv
- 8 Mid-Week Special: Scuba Luv
- 10 Potato Rock: Scuba Luv
- 11 Santa Cruz: Scuba Luv
- 12 Anacapa: Scuba Luv
- 15 Mid-Week Special: Scuba Luv
- 17 Shark Photo Dive: Scuba Luv
- 18 Anacapa: Scuba Luv
- 19 Santa Cruz: Scuba Luv
- 22 Mid-Week Special: Scuba Luv
- 24 Santa Cruz Wrecks: Scuba Luv
- 25 Anacapa: Capt. Frog, 805/833-3781
- 26 Santa Cruz Pinnacles: Scuba Luv
- 29 Mid-Week Special: Scuba Luv
- 31 Shark Photo Dive: Scuba Luv

September:

- 1 Santa Barbara: Scuba Luv
- 2 Anacapa: Scuba Luv
- 5 Mid-Week Special: Scuba Luv
- 7 Anacapa: Scuba Luv
- 8-10 Closed Charter
- 12 Mid-Week Special: Scuba Luv
- 14-16 Closed Charter
- 19 Mid-Week Charter: Scuba Luv
- 21 Shark Photo Dive: Scuba Luv
- 22 Anacapa: Capt. Frog, 805/833-3781
- 23 Painted Caves: Scuba Luv
- 26 Mid-Week Special: Scuba Luv
- 28-29 Shark Dive: Scuba Luv
- 30 Santa Cruz: Scuba Luv

Spectre, 805/483-6612, 805/642-1233

Ventura Harbor Village
85/34 Divers/Capt. Ted Cumming
Call numbers above for open boats.

July:

- 1 Anacapa/Santa Cruz: Scuba Duba, 818/881-4545
- 4 West Santa Cruz: D&W Hydro, 805/581-1142
- 7 Anacapa/Santa Cruz: Desert Scuba, 805/948-8883
- 8 Anacapa/Santa Cruz: Blue Cheer, 213/828-1217
- 13 Capt.'s Choice: Explorers Club, 805/483-6612
- 14 Anacapa/Santa Cruz: Blue Cheer, 213/828-1217
- 15 Santa Rosa: Channel Islands Scuba, 805/644-3483
- 20 Anacapa/Santa Cruz: No Game Day, 805/483-6612
- 21 Anacapa/Santa Cruz: Blue Cheer, 213/828-1217
- 22 Anacapa/Santa Cruz: Marina del Rey Divers, 213/827-1131
- 27 Capt.'s Choice: Explorers Club, 805/483-6612
- 28 Anacapa/Santa Cruz: Santa Barb. Aquatics, 805/964-8689
- 29 Anacapa/Santa Cruz: Far West Marine, 805/495-3600

August:

- 3 San Miguel: Open Boat, 805/483-6612
- 4 Anacapa/Santa Cruz: Blue Cheer, 213/828-1217
- 5 West Santa Cruz: Open Water Habitat, 714/744-8355
- 10-11 San Miguel: Santa Ana College, 714/693-8694
- 12 Anacapa/Santa Cruz: Scuba Duba, 818/881-4545
- 17 Anacapa/Santa Cruz: No Game Day, 805/483-6612
- 18 Anacapa/Santa Cruz: Blue Cheer, 213/828-1217
- 19 Anacapa/Santa Cruz: Far West Marine, 805/495-3600
- 24-25 Capt.'s Choice: Explorers Club, 805/483-6612
- 26 Anacapa/Santa Cruz: Santa Barb. Aquatics, 805/964-8689
- 31 West Santa Cruz: Open Boat, 805/483-6612

September:

- 1 Anacapa/Santa Cruz: Blue Cheer, 213/828-1217
- 2 Anacapa/Santa Cruz: Far West Marine, 805/495-3600
- 3 Santa Barbara: Channel Islands Scuba, 805/644-3483
- 8 Anacapa/Santa Cruz: Marina del Rey (1/2), 213/827-1131
- 9 Capt. Frog (1/2), 805/833-3781
- 9 Anacapa/Santa Cruz: Scuba Duba, 818/881-4545
- 14 Anacapa/Santa Cruz: No Game Day, 805/483-6612
- 15 Anacapa/Santa Cruz: Santa Ana College, 714/693-8694
- 16 Anacapa/Santa Cruz: Blue Cheer, 213/828-1217
- 21 Capt.'s Choice: Explorers Club, 805/483-6612
- 22 Anacapa/Santa Cruz: Desert Scuba, 805/948-8883
- 23 Anacapa/Santa Cruz: Santa Barb. Aquatics, 805/964-8689
- 29 Anacapa/Santa Cruz: Blue Cheer, 213/828-1217

- 30 Anacapa/Santa Cruz: Far West Marine, 805/495-3600

CHANNEL ISLANDS

Sandy Bay, 213/828-2418

32/6 Divers/Capt. Bob Perry
Call for available dates.

SAN PEDRO

Atlantis, 213/831-6666

22nd St. Landing
65/35 Divers/Capt. Brian Dull
Call for available dates.

Bold Contender, 818/366-2611

22nd St. Landing
65/34 Divers/Capt. Jerry Shapiro
Call for available dates.

Cee Ray, 213/519-0880,

213/867-9738
22nd St. Landing
65/30 Divers/Capt. Arnold Lancaster,
Tom Matlock
July:

- 1 Santa Barbara: Santa Monica Bluefins, 213/391-0948
- 2 Catalina: Sport Chalet, 818/790-9800
- 4 Catalina: Mariners Dive Club, 714/559-0846
- 7 San Clemente: Sport Chalet, 818/790-9800
- 8 San Clemente: Reef Seekers, 213/652-4990
- 9 Catalina: Sport Chalet, 818/790-9800
- 14 Santa Ana College, 714/693-8694
- 15 Catalina: Sport Chalet, 818/790-9800
- 16 Catalina: Sport Chalet, 818/790-9800
- 21 San Clemente: Sea Sabres, 213/947-0625
- 23 Catalina: Sport Chalet, 818/790-9800
- 29 Marina del Rey Divers, 213/827-1131
- 30 Catalina: Sport Chalet, 818/790-9800

August:

- 4 Catalina: Sport Chalet, 818/790-9800
- 5 Santa Barbara: Reef Seekers, 213/652-4990
- 11 Catalina/Backside: Sea Sabres, 213/947-0625
- 12 Santa Barbara: Santa Monica Bluefins, 805/499-6929
- 19 Catalina: Sport Chalet, 818/790-9800
- 26 Marina del Rey Divers, 213/827-1131
- 27 Catalina: Sport Chalet, 818/790-9800

September:

- 1 Marina del Rey Divers, 213/827-1131
- 2 Catalina: Sport Chalet, 818/790-9800

- 3 Santa Barbara: Sport Chalet, 818/790-9800
- 8 Santa Barbara: Reef Seekers, 213/652-4990
- 9 Santa Barbara: Sport Chalet, 818/790-9800
- 15 Santa Barbara: Sea Sabres, 213/947-0625
- 22 Catalina: Sport Chalet, 818/790-9800
- 23 Marina del Rey Divers, 213/827-1131
- 30 Catalina: Sport Chalet, 818/790-9800

Charisma, 213/832-8304,

213/326-7460
22nd St. Landing
78/35 Divers/Capt. John Hess
Call for available dates.

Encore, 213/832-8304,

213/326-7460
22nd St. Landing
78/35 Divers/Capt. Randy Beaver
Call for available dates.

Golden Doubloon,

714/963-4378
22nd St. Landing
65/34 Divers/Capt. Greg Elliott
(Charters exclusively to Catalina)
Call number above for open boats or charters.
July:

- 1 Marina del Rey Divers, 213/827-1131
- 7 Marina del Rey Divers, 213/827-1131
- 8 Aquatic Center, 714/650-5440
- 11 Catalina/Backside: Open Boat
- 14 Black Barts, 714/496-5891
- 15 Black Barts, 714/496-5891
- 18 Catalina/Backside: Open Boat
- 21 Mr. Scuba, 714/838-6483
- 22 Aquatic Center, 714/650-5440
- 25 Catalina/Backside: Open Boat
- 28 Marina del Rey Divers, 213/827-1131
- 29 Mr. Scuba, 714/838-6483
- August:
- 1 Catalina/Backside: Open Boat
- 4 Marina del Rey Divers, 213/827-1131
- 8 Catalina/Backside: Open Boat
- 11 Black Barts, 714/496-5891
- 12 Aquatic Center, 714/650-5440
- 15 Catalina/Backside: Open Boat
- 18 Black Barts, 714/496-5891
- 19 Marina del Rey Divers, 213/827-1131
- 22 Catalina/Backside: Open Boat
- 25 Marina del Rey Divers, 213/827-1131
- 26 Aquatic Center, 714/650-5440
- 29 Catalina/Backside: Open Boat

September:

- 1 Open for Charter
- 2 Marina del Rey Divers, 213/827-1131
- 5 Catalina/Backside: Open Boat
- 8 Black Barts, 714/496-5891
- 9 Aquatic Center, 714/650-5440
- 12 Catalina/Backside: Open Boat
- 15 Marina del Rey Divers, 213/827-1131
- 16 Black Barts, 714/496-5891
- 19 Catalina/Backside: Open Boat
- 22 Marina del Rey Divers, 213/827-1131
- 23 Aquatic Center, 714/650-5440
- 26 Catalina/Backside: Open Boat
- 29 Mr. Scuba, 714/838-6483
- 30 Open for Charter

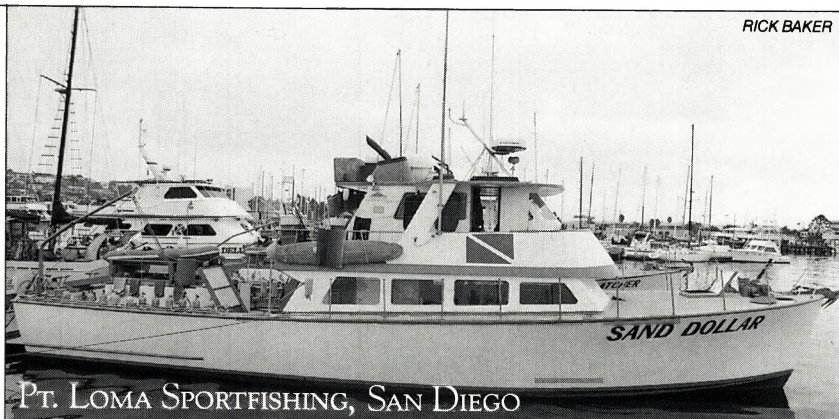
Magician, 213/548-6129

22nd St. Landing
65/35 Divers/Capt. Ira Burdine
Call number above for open boats.

July:

- 1 Catalina: Scuba Toys, 714/527-0430
- 4 Scuba Toys, 714/527-0430
- 7 San Clemente: Scuba Habitat, 714/594-7927
- 8 Catalina: Scuba Haus, 213/828-2916
- 14 Catalina: Sport Chalet, 818/790-9800

DIVE BOAT SCHEDULES



PT. LOMA SPORTFISHING, SAN DIEGO

RICK BAKER

- 15 Catalina: Divers West, 818/796-4287
- 21 Catalina: Scuba Haus, 213/828-2916
- 22 Scuba Toys, 714/527-0430
- 28 Catalina: Divers West, 818/796-4287
- 29 Catalina: Scuba Haus, 213/828-2916

August:

- 4 Scuba Toys, 714/527-0430
- 5 Catalina: Scuba Toys, 714/527-0430
- 11 Catalina: American Diving, 213/326-6663
- 12 Santa Barbara: Scuba Habitat, 714/594-7927
- 18 Catalina: Scuba Haus, 213/828-2916
- 19 Scuba Toys, 714/527-0430
- 25 Catalina: Divers West, 818/796-4287
- 26 Catalina: Scuba Haus, 213/828-2916

September:

- 1 San Clemente: Scuba Habitat, 714/594-7927
- 2 Catalina: Scuba Toys, 714/527-0430
- 8 Catalina: Sport Chalet, 818/790-9800
- 9 Catalina: Divers West, 818/796-4287
- 15 Catalina: Scuba Haus, 213/828-2916
- 16 Scuba Toys, 714/527-0430
- 22 Catalina: Sport Chalet, 818/790-9800
- 23 Catalina: Divers West, 818/796-4287
- 29 Catalina: Scuba Haus, 213/828-2916
- 30 Outer Island: American Diving, 213/326-6663

Maverick, 213/547-3824

22nd St. Landing
58/25-30 Divers/Capt. Floyd Bryan
Call number above for open boats.

July:

- 8 Catalina: New England Divers, 213/421-8939
- 15 Catalina: West Coast Divers, 818/708-8136
- 22 Wileys Scuba Locker, 714/653-1255
- 29 Reef Seekers, 213/652-4990

August:

- 5 Catalina: New England Divers, 213/421-8939
- 19 Wileys Scuba Locker, 714/653-1255
- 25 Catalina: Reef Seekers, 213/652-4990
- 26 Catalina: New England Divers, 213/421-8939

September:

- 2 Catalina: West Coast Divers, 818/708-8136
- 16 Catalina: New England Divers, 213/421-8939
- 22 Catalina: Reef Seekers, 213/652-4990
- 23 Catalina: West Coast Divers, 818/708-8136

Scuba Queen, 213/691-0423

Cabrillo Marina
65/38 Divers/Capt. Ed Lord
Call for available dates.

Westerly, 213/833-6048

22nd St. Landing
55/30 Divers/Capt. Jim Ingram
Call above number for open boats.

July:

- 1 Santa Barbara: Mr. Scuba, 714/838-6483
- 4-5 San Clemente: Tom Steinhoff, 213/833-6048
- 7 Santa Barbara: Douglas Dive Club, 714/960-2764
- 8 Catalina/Backside: Dive 'n Surf, 213/372-8423
- 12 Catalina: Shelly Johnson
- 13 Catalina: Dive 'n Surf, 213/372-8423

- 14 San Clemente: Dive 'n Surf, 213/372-8423
- 15 San Clemente: Golden Reef Divers, 818/443-2103
- 21 San Nicolas: Hughes Dive Club, 213/324-8583
- 22 Catalina/Backside: Dive 'n Surf, 213/372-8423
- 26-27 San Clemente: Westerly, 213/833-6048
- 28 Santa Barbara: Dive 'n Surf, 213/372-8423
- 29 Whalers Dive Club, 213/675-2123

August:

- 4 Farnsworth Bank: Douglas Dive Club, 714/960-2764
- 5 Catalina/Backside: Dive 'n Surf, 213/372-8423
- 11 San Clemente: Dive 'n Surf, 213/372-8423
- 12 John Roodenburg, 213/536-0404
- 17 Catalina: Dive 'n Surf, 213/372-8423
- 18 Santa Barbara: Hughes Dive Club, 213/324-8583
- 19 Catalina/Backside: Dive 'n Surf, 213/372-8423
- 23-24 Santa Barbara/Catalina: Westerly, 213/833-6048
- 25 San Clemente: Dive 'n Surf, 213/372-8423
- 26 Catalina: Dive 'n Surf, 213/372-8423

September:

- 1 Santa Barbara: Dive 'n Surf, 213/372-8423
- 2 San Clemente: Mr. Scuba, 714/838-6483
- 3 Catalina/Backside: Dive 'n Surf, 213/372-8423
- 8 Begg Rock: Douglas Dive Club, 714/960-2764
- 9 Catalina/Backside: Dive 'n Surf, 213/372-8423
- 14 Catalina: Dive 'n Surf, 213/372-8423
- 15 Begg Rock: Hughes Dive Club, 213/324-8583
- 16 Santa Barbara: Desert Divers, 805/948-6801
- 22 San Clemente: Dive 'n Surf, 213/372-8423
- 23 Farnsworth Bank: Golden Reef Divers, 818/443-2103
- 29 Santa Barbara: Whalers Dive Club, 213/675-2123
- 30 Catalina/Backside: Dive 'n Surf, 213/372-8423

Wild Wave, 213/534-0034

22nd St. Landing
65/26 Divers/Capt. Mickey Pittman
Call for available dates.

LONG BEACH

Mr. C, 213/831-9449

Long Beach Sportfishing
55/40 Divers/Capt. Tom Rossin
Call for available dates.

Sun Diver, 213/434-1198

Seaport Village
53/28 Divers/Capt. Rich Wallace
Call number above for open boats.

July:

- 1 Farnsworth Bank: Len Tillem, 973-5175
- 6 Open Boat
- 7 Catalina: Pacific Sporting Goods, 213/434-1604
- 8 San Clemente: West Coast Divers, 818/708-8137
- 14 Catalina: Ski & Sport, 714/633-1880
- 15 San Clemente: Sta & Spa, 714/825-2502
- 20 Open Boat
- 21 Catalina: Openwater Habitat, 714/744-8355
- 22 Catalina: West Coast Divers, 818/708-8137
- 28 Catalina: Pacific Sporting Goods, 213/434-1604

August:

- 3 Open Boat
- 4 Catalina: Ski & Sport, 714/633-1880
- 5 Open Boat
- 11 Catalina: Pacific Sporting Goods, 213/434-1604
- 12 West Coast Divers, 818/708-8137
- 17 Open Boat
- 18 Begg Rock: UPS, 385-7381
- 19 San Clemente: Openwater Habitat, 714/744-8355
- 25 Open Boat
- 26 West Coast Divers, 818/708-8137
- 29 Catalina: Ski & Sport, 714/633-1880

September:

- 1 Catalina: Pacific Sporting Goods, 213/434-1604
- 2-3 Openwater Habitat, 714/744-8355
- 8 Open Boat
- 9 Open Boat
- 15 Catalina: Pacific Sporting Goods, 213/434-1604
- 16 West Coast Divers, 818/708-8137
- 22 Ski & Sport, 714/633-1880
- 23 San Clemente: Len Tillem, 973-5175
- 29 West Coast Divers, 818/708-8137
- 30 Pacific Sporting Goods, 213/434-1604

AVALON HARBOR

King Neptune, 213/510-2616,

800/262-DIVE

65/30 Divers/Capt. Bob Kennedy

July:

- 2 Shark Dive: Open Boat, 800/677-4275
- 8 Shark Dive: Open Boat, 800/677-4275
- 11-12 Cortez Bank/San Clemente: Open Boat, 213/510-2616
- 21 San Clemente: Open Boat, 213/510-2616

- 28 Santa Barbara: Open Boat, 213/510-2616
- 30 Farnsworth Bank: Open Boat, 213/510-2616

August:

- 17 Shark Dive: Open Boat, 800/677-4275
- 18 San Clemente: Open Boat, 213/510-2616
- 27 Shark Dive: Open Boat, 800/677-4275
- 28-29 San Nicolas/Santa Barbara: Open Boat, 213/510-2616
- 31 Farnsworth: Open Boat, 213/510-2616

September:

- 3 Shark Dive: Marina del Rey Divers, 213/827-1131

SAN DIEGO

America II, 619/584-0742

35/15 Divers/Capt. Rich Cassens
Call number above for open boats.

July:

- 3 Open Boat
- 4 Open Boat
- 5 Open Boat
- 6 Open Boat
- 7 Wreck Alley/El Rey: Open Boat
- 8 Pt. Loma Kelp Beds: Open Boat
- 10 Open Boat
- 11 Open Boat
- 12 Open Boat
- 13 Open Boat
- 14 Wreck Alley/Ruby E: Open Boat
- 15 La Jolla Kelp Beds: Open Boat
- 17 Open Boat
- 18 Open Boat
- 19 Open Boat
- 20 Open Boat
- 21 Wreck Alley/Ruby E: Open Boat
- 22 Pt. Loma Kelp Beds: Open Boat
- 24 Open Boat
- 25 Open Boat
- 26 Open Boat
- 27 Open Boat
- 28 Wreck Alley/Ruby E: Open Boat
- 29 Pt. Loma Kelp Beds: Open Boat
- 31 Open Boat

August:

- 1 Open Boat
- 2 Open Boat
- 3 Open Boat
- 4 Wreck Alley: Open Boat
- 5 Pt. Loma Kelp Beds: Open Boat
- 7 Open Boat
- 8 Open Boat
- 9 Open Boat
- 10 Open Boat
- 11 Wreck Alley: Open Boat
- 12 La Jolla Kelp Beds: Open Boat
- 14 Open Boat
- 15 Open Boat
- 16 Open Boat
- 17 Open Boat
- 18 Wreck Alley: Open Boat
- 19 Pt. Loma Kelp Beds: Open Boat
- 21 Open Boat
- 22 Open Boat
- 23 Open Boat
- 24 Open Boat
- 25 Wreck Alley: Open Boat
- 26 La Jolla Kelp Beds: Open Boat

- 28 Open Boat
- 29 Open Boat
- 30 Open Boat
- 31 Open Boat

September:

- 1 Wreck Alley: Open Boat
- 2 Pt. Loma Kelp Beds: Open Boat
- 4 Open Boat
- 5 Open Boat
- 6 Open Boat
- 7 Open Boat
- 8 Wreck Alley: Open Boat
- 9 La Jolla Kelp Beds: Open Boat
- 15 Wreck Alley: Open Boat
- 16 La Jolla Kelp Beds: Open Boat
- 18 Open Boat
- 19 Open Boat
- 20 Open Boat
- 21 Open Boat
- 22 Wreck Alley: Open Boat
- 23 Pt. Loma Kelp Beds: Open Boat
- 25 Open Boat
- 26 Open Boat
- 27 Open Boat
- 28 Open Boat
- 29 Wreck Alley: Open Boat
- 30 La Jolla Kelp Beds: Open Boat

Bottom Scratcher,

619/224-4997

Pt. Loma Sportfishing
63/21 Divers/Capt. Mel Osland

July:

- 4 Coronados: Ocean Enterprises, 619/565-6054
- 7-8 San Clemente: Scuba Science, 602/995-5926
- 14-15 San Clemente: Scuba Science, 602/995-5926
- 21 Coronados: Diving Locker, 619/272-1120
- 22-27 San Benito Island: Scuba Science, 602/995-5926

Horizon, 619/277-7823

H & M Landing
78/35-42 Divers/Capt. Greg Grivetto

July:

- 7 Coronados: Sport Chalet, 619/224-6777
- 15 Coronados: Sport Chalet, 619/224-6777
- 20-21 San Clemente: Sun Divers, 602/996-7665
- 22 Coronados: Sport Chalet, 619/224-6777
- 25 To be announced: Ski & Sports, 714/633-1880
- 28-29 San Clemente: Sport Chalet, 619/224-6777

August:

- 12 Coronados: Sport Chalet, 619/224-6777
- 22 To be announced: Ski & Sports, 714/633-1880
- 24-25 San Clemente: Sport Chalet, 619/224-6777
- 30-9/3 San Benito: Sport Chalet, 619/224-6777

September:

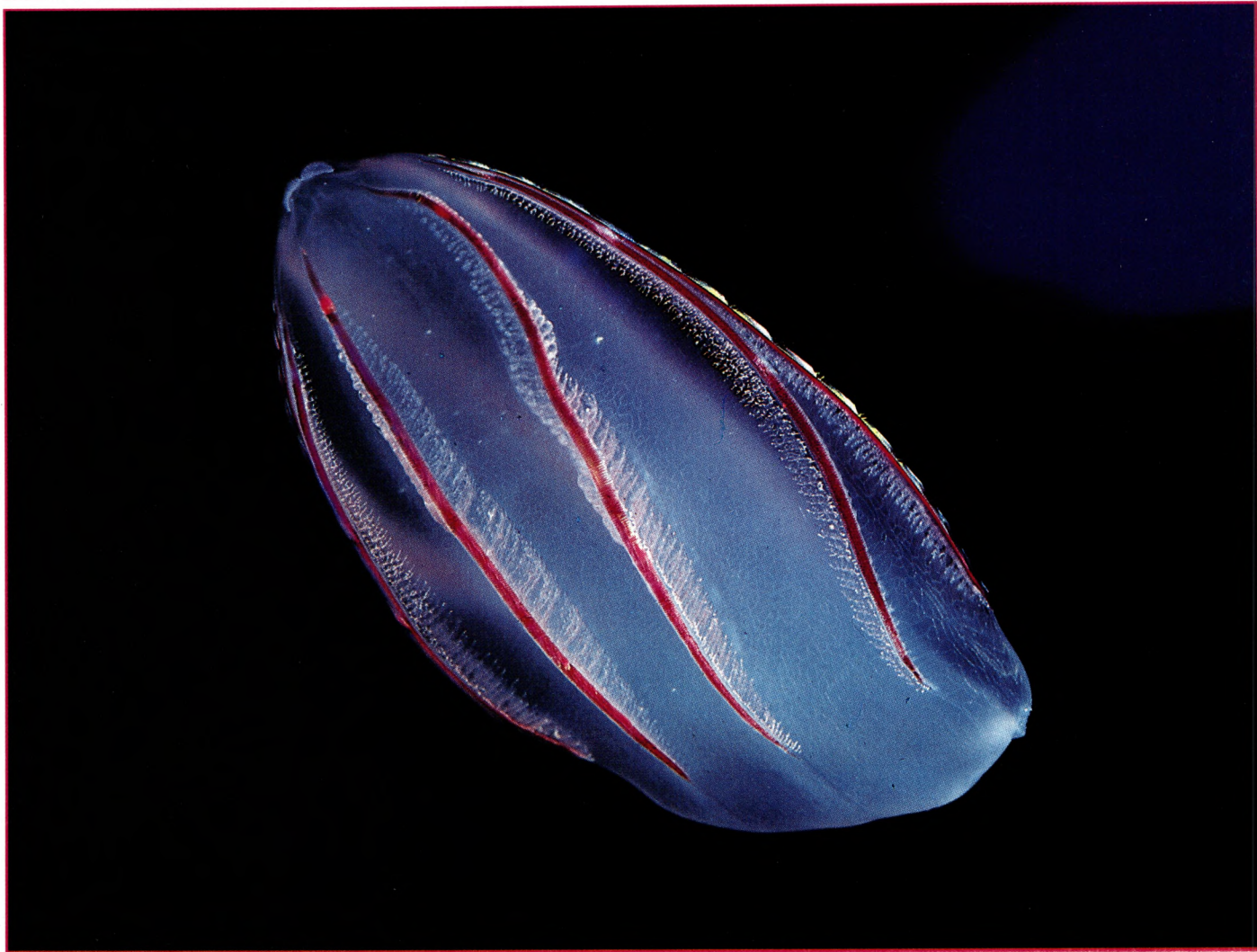
- 8 Coronados: Sport Chalet, 619/224-6777
- 9 Coronados: Openwater Habitat, 714/744-8355
- 15-16 Coronados: Reef Seekers, 213/652-4990
- 21-22 San Clemente: Sundiver, 602/996-7665
- 23 Coronados: Sport Chalet, 619/224-3439
- 29-30 San Clemente: El Mar Dive, 602/833-2971

Sand Dollar, 619/224-4997

Pt. Loma Sportfishing
65/28 Divers/Capt. Bill Johnston

July:

- 4 Coronados: Diving Locker, 619/746-8980
- 7-8 San Clemente: San Diego Divers, 619/224-3439
- 14 San Clemente: Adventures in Diving, 714/499-4517
- 15 Coronados: Diving Locker, 619/755-6822
- 17-19 Closed Charters
- 21-22 San Clemente: Scuba Science, 602/995-5926
- 24-8/4 Mexico Spearfishing: Diving Charters, 619/224-4997



Beroe forskali
 Phylum: Ctenophora
 Class: Nuda
 Order: Berioda
 Family: Beroidae

Article and photo by David Wrobel

Beroe are among the largest of the comb jellies and may exceed six inches in length. As with all ctenophores, eight body-length comb rows formed by numerous hair-like cilia refract light to produce shifting patterns of all the colors of the rainbow. This shimmering effect is caused by the coordinated beating of the rows of cilia to produce waves that slowly propel the animal. When illuminated by rays of sunlight, a hovering *Beroe* with its kaleidoscopic color bands is truly a mesmerizing sight.

At one end of *Beroe*'s flattened, oblong body is a massive mouth. Many comb jellies prey on copepods and other tiny zooplankton with the aid of a pair of long sticky tentacles. *Beroe* lack these tentacles and instead engage in the gruesome habit of engulfing other ctenophores, even those of equal size. If a large ctenophore is more than a mouthful, then *Beroe* merely bites off a chunk of the hapless victim. These gelatinous eating machines are the nemesis of another comb jelly, *Pleurobrachia* (the

sea gooseberry), whose populations can be decimated by *Beroe*.

In sexual affairs *Beroe* and other ctenophores have the best of both worlds. Being hermaphrodites they possess both male and female gonads and are capable of self-fertilization. During dense swarms, cross-fertilization is the norm, with the sequential release of sperm and eggs by all individuals within the group. Fertilized eggs develop into tiny, rapid-growing planktonic larva that resemble their parents. Comb jellies grow at explosive rates, an adaptation that enables their populations to respond quickly to ephemeral food supplies.

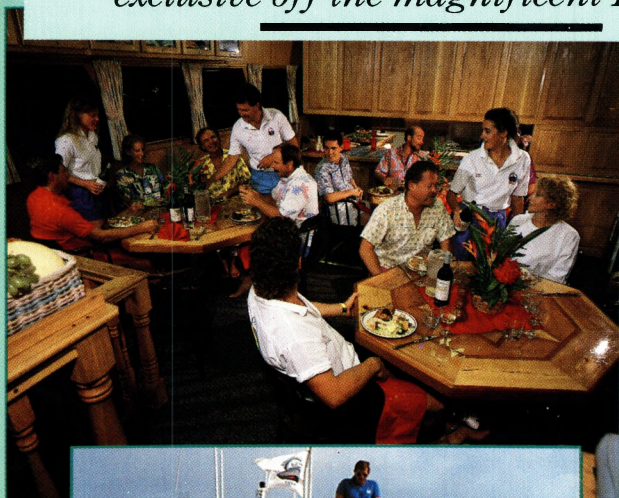
Take a closer look the next time a group of these gelatinous balls crosses your path. Helpless lumps out of the water, ctenophores have a stunning, yet subtle beauty that is easy to overlook when thrashing through the kelp. □

David Wrobel is an aquarist and biologist at the Monterey Bay Aquarium, with a special interest in life in kelp forests.



PHOTOS BY RAY MAINS

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Dive time	•	•	•
Maximum depth	•	•	•
Monitoring rate of ascent	•	•	•
Surface interval	•	•	•
Logbook for prior dives	4	9	9
Temperature (water/air)	•	-	-
No decompression time	-	•	•
No decompression limit (scrolling)	-	•	•
Deepest decompression stop	-	•	•
Alarm indicating contravention of decompression	-	•	•(1)
Desaturation time	-	•	•
Altitude sector (if at high altitude)	-	•	•
High altitude adaption time	-	•	•
Tissue number indicator for incomplete decompression	-	•	•
Operating mode indicator	-	•	•
Low battery warning	-	•	•
No flying indicator	-	-	•
Waiting time prior to flying	-	-	•
Acoustic ascent rate & decompression alarm	-	-	•
Luminous florescent face	-	-	•
Total time of ascent	-	-	•

(1) - 2 step flashing and acoustic beep alarm